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Empirical Res Voc Ed Train (2024) 16:15
https://doi.org/10.1186/s40461-024-00169-x

Empirical Research in
Vocational Education and Training

RESEARCH Open Access

Different dropout directions in vocational education and training: the role of the initiating party and trainees' reasons for dropping out

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Abstract

The high rates of premature contract termination (PCT) in vocational education and training (VET) programs have led to an increasing number of studies examining the reasons why adolescents drop out. Since adolescents' trajectories after a PCT are quite diverse, a thorough assessment of different *dropout directions* is called for. However, empirical studies that distinguish between dropout directions are still scarce. The same is true for studies that differentiate between PCTs initiated by the trainees themselves and those initiated by the training company. Based on data from the German National Educational Panel Study (NEPS) on trainees in German dual VET programs ($n = 5823$), this study identifies six different dropout directions: (1) downward PCT into unqualified employment or unemployment, (2) downward PCT into a prevocational program, (3) horizontal PCT that represents a change of training company or (4) a change of occupation, and (5) upward PCT into general education or (6) higher education. Using multinomial logistic regression models we examine the effect of (a) the initiating party and (b) self-reported PCT reasons of trainees on dropout directions. Regarding trainees' reasons we include reasons related to different aspects of the training (personal reasons, not the desired training occupation, financial reasons, training quality, conflicts, excessive demand, and being offered a different training position). The results indicate that in cases where trainees are dismissed by the training company, a horizontal change to a different training company becomes more likely, while the probability of an upward dropout into higher education decreases. Regarding PCT decisions made by trainees themselves, a downward PCT into unqualified employment or unemployment is more likely if personal reasons were the cause of a PCT decision. Moreover, the probability of a change of training company (horizontal PCT) increases in cases of conflict and if there is a prospect of a different training position, and decreases if the training position is not the desired occupation. A change of occupation (horizontal PCT) is more likely when there is the opportunity for a different training position available. Furthermore, upward PCTs (both into further general education and higher education) are more likely in cases where the training was in a field that was not the desired occupation. The probability of upward PCT into higher education decreases when there are conflicts and excessive demands, while upward PCTs into general education are significantly less likely when a different training position is obtained. The differential effects that occur for different types of PCTs emphasize

that adolescents dropping out of VET cannot be treated as a homogenous group. Consequently, the results underscore the importance of conducting a more thorough assessment of both dropout directions and the initiating party of a PCT in future research.

Introduction

Vocational education and training (VET) systems are regularly faced with high rates of premature contract termination (PCT). While PCTs are certainly problematic for those trainees who drop out of the educational system entirely without a formal qualification (Michaelis and Findeisen 2024 even identify long-term effects on individuals' subjective well-being), they can also be a means of adjusting wrong career choices. Current studies reveal that a PCT is often a *stopout* rather than a *dropout* of the educational system (Holtmann and Solga 2023; Michaelis and Richter 2022; Wydra-Somaggio 2021). The majority of adolescents re-enter the educational system after experiencing a PCT; in the case of Germany, Michaelis and Richter (2022) refer to 63%, and Wydra-Somaggio (2021) to 71%. Similar numbers are reported for Switzerland—Schmid and Stalder (2012) refer to 72%. Therefore, most PCTs rather result in non-linear pathways into the labor market that are not uncommon in the life courses of adolescents (Buchmann 1989; Mayer 2001; Michaelis et al. 2022). Some PCTs can even have positive long-term effects on individuals' well-being (Michaelis and Findeisen 2024). This calls for a distinct assessment of different types of PCTs from a life course perspective, which considers trajectories after a PCT to derive both political and research implications.

Several scholars have suggested categorizations of different PCT types that consider subsequent trajectories. For example, Schmid and Stalder (2012) identify four *dropout types*, differentiating between actual dropouts (no re-entry) and three types of dropouts with re-entry: (1) inter-organizational change, (2) downgrading or upgrading (changing to an apprenticeship with lower or higher requirements within the same occupational field), and (3) occupational change. In a similar approach, Krötz and Deutscher (2022) identify four *dropout directions*: downwards (no qualification), upwards (higher education), and horizontal, which can either mean a change of companies or a change of occupations. There are only a limited number of empirical studies that differentiate between different dropout directions (Bessey and Backes-Gellner 2015; Findeisen et al. 2024a, b; Holtmann and Solga 2023; Michaelis and Richter 2022; Wydra-Somaggio 2021) or dropout intentions (Krötz and Deutscher 2022). Consequently, most studies treat trainees who prematurely terminate their training contract as a homogenous group. However, this approach does not allow a detailed enough picture of the decision-making processes and reasons for a PCT, which can be expected to differ between different dropout directions (Holtmann and Solga 2023; Krötz and Deutscher 2022).

In this regard, the first shortcoming is that studies generally fail to take the initiating party of a PCT decision into account. While in 77% of the cases, training contracts are terminated by the trainees themselves or by mutual agreement between the trainee and the training company, 23% of PCTs occur based on the decision of the training company (BIBB 2020). Empirical studies that specifically differentiate between initiating parties in dropout decision in VET are still scarce (with the exception of Beckmann 2023). Moreover, to the best of our knowledge there is a complete lack of empirical evidence

on the relationship between the initiating party and different dropout *directions*. The second shortcoming is that we do not know enough about the relationship between the reasons of the parties involved in the PCT decision (trainees and training companies), especially in relation to different dropout directions. Evidence from the literature indicates that PCTs can be related to a wide range of reasons, such as individual factors and training-related issues. PCTs typically occur due to a combination of factors, rather than a single cause (e.g., Böhn and Deutscher 2022; Schmid 2010). However, there are only a limited number of findings on the relationship between different reasons and the developments after a PCT (for exceptions see Holtmann and Solga 2023, as well as Michaelis and Richter 2022 for different dropout directions, and Krötz and Deutscher 2022 for different directions of dropout *intentions*). A better understanding of the reasons for termination decisions by both trainees and training companies is necessary to provide better support for both parties during termination processes. Evidence suggests that trainees and training companies have differing perspectives on the reasons for PCT (Stalder and Schmid 2006; for differences in perception of training quality see Filliettaz 2010, Krötz and Deutscher 2021, and Negrini et al. 2016). Since this study relies on data from the German National Educational Panel Study (NEPS; Blossfeld et al. 2011), we are only able to draw on dropout reasons reported by trainees, as data on training companies' perspectives is not available. As mentioned earlier, the majority of PCTs in VET are initiated by trainees themselves. Therefore, it is likely that trainees play a significant role in the decision to terminate the training contract. Since it is unclear whether post-termination developments reflect informed decisions by the trainee, it is important to analyze both the immediate reasons for PCT and the subsequent directions taken by the trainee in one comprehensive analysis.

It is against this background that we examine the differences between different dropout directions in VET. We are specifically interested in the relationship between the dropout direction and (a) the party initiating a PCT and (b) trainees' reasons for a PCT. Therefore, this paper addresses the current trend towards a specific assessment of dropout directions using data on actual PCTs. It builds upon previous research by offering new evidence on the role of the party initiating a PCT and by connecting trainees' self-reported reasons for PCTs to various dropout directions.

Theoretical foundation and state of research

Initiating party of PCTs

In the German dual VET system, PCTs can occur based on the decision of the trainee, the training company (restricted by statutory protection against termination regulations) or by agreement of both parties. Previous research indicates that trainees and training companies may have differing perceptions of training quality (e.g., Filliettaz 2010; Krötz and Deutscher 2021; Negrini et al. 2016) and reasons for PCTs (Stalder and Schmid 2006). However, studies on PCTs often fail to differentiate between the parties initiating the PCT (with the exception of Beckmann 2023). This leads to a homogeneous treatment of PCTs that may have different implications, including various outcomes for adolescents. A survey of adolescents who experienced a PCT (Schöngen 2003) revealed that a higher percentage of individuals enter another (vocational) education program after a PCT if they initiated the termination themselves (67%)

compared to being dismissed by the training company (55%). Accordingly, the rate of unemployment is lower after a voluntary termination (22%) than after a termination by the company (36%). This may also be linked to the impact of PCTs on individuals' well-being. Generally, PCT can result in feelings of failure for the individual and carry a risk of negative psychological effects such as low self-esteem and depression (Schmid 2010). Being dismissed by the training company may even have a stronger impact on individuals' attitudes and well-being, as seen in studies on the far-reaching impacts of job loss (e.g., Brand 2015), which could further influence their subsequent trajectories. Moreover, a survey conducted by Stalder and Schmid (2006) revealed that trainers often state performance issues and lack of effort as the main reasons for PCTs (company: poor performance—48%, lack of effort—44%; vocational school: poor performance—57%, lack of effort—50%). If we consider that dismissals by the training company are more likely to occur due to inadequate performance during VET, company-initiated PCTs may limit the options available for trainees' subsequent trajectories. This is supported by Beckmann's (2023) findings, which suggest that dismissals by training companies decrease with higher levels of education and higher grade point averages (GPAs).

Overall, including the initiating party in PCT analysis is necessary to paint a more accurate picture of dropout decisions, especially since empirical evidence on the relationship between the initiating party and dropout directions is still lacking. It is particularly important to differentiate between dropout directions, since it is plausible to assume that the trainees' involvement in the PCT decision varies depending on the type of PCT (e.g., Findeisen et al. 2024a, b). For example, it can be expected that trainees play a larger role in deciding on upward and horizontal PCTs compared to downward dropouts. When PCTs are based on trainees' own decisions, individuals must consider the consequences of different trajectories after the PCT when contemplating terminating their training contract. Consequently, a closer examination of trainees' reasons for different dropout directions is warranted.

Trainees' reasons for PCTs

Trainees' self-reported reasons for PCTs (without distinguishing between dropout directions)

Drawing from common theoretical approaches utilized in dropout research, it is reasonable to expect that the choice to drop out is a process and that dropout decisions are made over a longer period of time (Dawis and Lofquist 1984; Tinto 1975). Qualitative empirical evidence from the field of VET supports this notion, demonstrating that trainees contemplate dropout decisions over time, overcoming various challenges along the way (Jonker 2006; Lamamra and Masdonati 2008). Moreover, quantitative evidence suggests a moderate correlation between dropout intentions and actual dropout (Findeisen et al. 2024a, b), reinforcing the notion that PCTs are the result of a deliberative decision-making process. Therefore, this study focuses on trainees' self-reported reasons for PCT decisions to gain insight into their decision-making processes.

Previous research has demonstrated that trainees' decisions to prematurely terminate their training contracts are influenced by various factors, including personal reasons, company-related issues, training quality, and lack of fit (Böhn and Deutscher 2022; Schmid 2010). Personal reasons cited by trainees have been shown to be related to health problems, accidents, or changes in family circumstances (Schöngen 2003; Stalder

and Schmid 2006). According to a study by BIBB (2020) on trainees in the German dual VET system, 18% of those who left their training early cited personal reasons such as health problems. Another important factor is a lack of fit between the individual and the training occupation, or the trainee's realization that the career choice was not the right one (Lamamra and Masdonati 2008; Piening et al. 2010; Schöngen 2003). In a survey of Swiss trainees ($N=1289$) dropouts reported insufficient prior knowledge about the training company (28%) or the occupation (14%), or loss of interest in the occupation (26%; Stalder and Schmid 2006). As access to VET is limited, trainees may be willing to accept a training contract for an occupation that was not their desired choice, resulting in a poor fit, based on their fear of ending up without any vocational education (Stalder 2012). According to the ranking of PCT reasons provided by BIBB (2020), the most frequently mentioned reason (60%) was that the training occupation did not match the desired occupation. An additional 23% of adolescents cited financial reasons (dissatisfaction with current or future salary) as reasons for their PCT.

Moreover, aspects related to the training process and training quality contribute to PCT decisions. Reasons for trainee dropouts include poor working climate and training conditions (Lamamra and Masdonati 2008), unpleasant work tasks, and lack of participation (Stalder and Schmid 2006), as well as conflicts and communication problems (BIBB 2020; Piening et al. 2010; Schöngen 2003; Stalder and Schmid 2006). In the study on dropouts in German VET programs mentioned above (BIBB 2020), 39% of trainees cited insufficient instruction on training content and 14% excessive demands of the training program as reasons for their PCT. Similar results were found in an earlier study by Schöngen (2003). Finally, the results reported by BIBB (2020) show that 21% of trainees cited the prospect of a new training position as the reason for their PCT decision.

Existing results further indicate that reported reasons differ among adolescents based on their school-leaving qualifications. For example, the proportion of adolescents who cited a lack of fit with the training occupation as a reason for their PCT was highest among those with a university entrance qualification and decreased as the level of their school-leaving qualifications lowered. Furthermore, conflicts, personal reasons, and difficulties with training content were most often reported in the group with low school-leaving qualifications (BIBB 2020). A connection between lower school-leaving qualifications and excessive demands was also identified in the results of Schöngen (2003). The perception of trainees that their training program poses excessive demands may also stem from a poor fit between the trainee and the occupation (Stalder 2012). Once again, this highlights the interconnectedness of the various PCT reasons described above.

Evidence on the relationship between trainees' dropout reasons and dropout directions

The studies on trainees' reasons for PCTs reported in Sect. "Initiating party of PCTs" conceptualize PCT as one category. However, this conceptualization is limited because different dropout directions vary significantly in terms of both reasons and consequences for individuals (e.g., Krötz and Deutscher 2022). While changing one's training occupation can be a valid way to correct mistaken career choices and potentially have positive outcomes for individuals (e.g., satisfaction, career success), a PCT resulting in unemployment

or unqualified employment significantly limits individuals' career prospects. In addition, changing training companies may allow trainees to seamlessly continue their training program, whereas changing occupations may result in a longer waiting period since VET programs typically begin in the summer or fall. To date, only a few studies have examined trainees' reasons for different dropout directions (Bessey and Backes-Gellner 2015; Schmid 2010). Bessey and Backes-Gellner (2015) examined the impact of different PCT reasons on dropout directions (dropout, upgrade, changing within VET). They found that financial distress as a reason for termination was significantly positively associated with dropout, but not with upgrades (compared to adolescents who made changes within VET). Moreover, neither dropouts nor upgrades were linked to any of the other reasons examined (bad prospects, bad income prospects, bad career prospects, and exam nerves). The findings of Schmid (2010) indicate that a direct re-entry into VET after a PCT is more likely than a delayed re-entry or no re-entry) if the PCT was due to reasons of occupational choice, bankruptcy/re-structuring of the training company, or personal reasons/illness/accidents of trainees. However, training conditions and lack of challenge did not significantly impact re-entry, nor did trainees' performance and behavior at either school or the training company. The latter did, however, significantly affect delayed re-entry into VET (compared to not re-entering VET at all).

Valuable insights regarding our research question can also be gained from other studies, even though they did not focus specifically on trainees' dropout reasons (Holtmann and Solga 2023; Krötz and Deutscher 2022; Michaelis and Richter 2022). Concerning training quality, overload appears to affect horizontal types of dropout intention (occupation change, company change) as well as upward dropout intention; other aspects of training quality (e.g., feedback, mentoring, non-training tasks) are related to horizontal company changes only (Krötz and Deutscher 2022). Similarly, a general dissatisfaction with the training program leads to a higher probability of horizontal PCTs (company changes or occupational changes; Holtmann and Solga 2023). Moreover, high training requirements and low performance prior to VET affect downward dropout intentions (Krötz and Deutscher 2022). Finally, not being trained in the desired occupation increases the likelihood of downward PCTs (Holtmann and Solga 2023; Michaelis and Richter 2022) or occupational changes (Holtmann and Solga 2023; Krötz and Deutscher 2022).

While these studies indicate, that different reasons are related to different dropout directions, there is still a need for further examination of the relationship.

The present study

The present study examines the relationship between the initiating party and the reasons for a PCT and different dropout directions. It focuses on trainees in German dual VET programs, where 26.7% of trainees terminate their training contract prematurely (BIBB 2023). This paper addresses two research questions, which are set out below.

> (1) How are different dropout directions related to the initiating party of a PCT (decision of the trainee vs. termination by the company)?

There are very few studies that differentiate between voluntary trainee terminations and dismissals by the training company. However, insights into this question

are crucial for better supporting both trainees and training companies in cases of imminent PCTs. Existing evidence suggests that terminations by the training company occur due to performance difficulties or lack of effort (Beckmann 2023; Stalder and Schmid 2006). In addition, it appears that trainees are more likely to re-enter VET after a PCT in cases of voluntary terminations (Schöngen 2003). Based on this, we formulate two hypotheses. We hypothesize that adolescents are more likely to experience horizontal PCTs (changing companies or changing occupations) or upward PCTs if the termination was initiated by themselves, as opposed to a termination initiated by the company (H1). Moreover, we expect that dismissals by companies are related to a higher probability of downward PCTs (H2).

(H1) If the training company initiated a PCT, horizontal or upward PCTs are less likely
(H2) If the training company initiated a PCT, downward PCTs are more likely

For those PCTs that are initiated by the trainees themselves, we are interested in the relationship between self-reported reasons and dropout directions. Our second research question is the following.

(2) How are different dropout directions related to self-reported reasons for a PCT?

First, we hypothesize that personal reasons are related to a higher probability of a downward PCT (H3). Since Schmid (2010) found that personal reasons, illness, or accidents increase the probability of direct re-entry into VET, we hypothesize that horizontal PCTs are more likely in cases where trainees cite personal reasons for a PCT.

(H3) Personal reasons for a PCT are related to a higher probability of horizontal PCTs

Moreover, it seems highly plausible that in cases where PCTs occur due to a lack of fit between the individual trainee and the training occupation (i.e., *occupational mismatch*; e.g., Horváth 2014), PCTs are used as a means to adjust career choices (e.g., Michaelis and Richter 2022). Therefore, we expect trainees to subsequently choose either a VET program in a different occupation (Holtmann and Solga 2023; Krötz and Deutscher 2022; Schmid 2010) or a general or higher education program (H4).

(H4) Occupational mismatches are related to a higher probability of horizontal changes into a different occupation or of upward changes

In addition, we examine the role of financial reasons (current or future earnings) on dropout directions. We hypothesize that financial reasons increase the likelihood of occupational changes or of downward PCTs (H5). This would mean that adolescents who are unsatisfied with their current or future earnings would either adjust their occupational choice or, in cases of financial distress—for instance, the necessity to take up additional employment (Seidel 2019)—they would experience a downward

PCT. The results of Bessey and Backes-Gellner (2015) indicate that adolescents who cited financial distress as reason for PCT are more at risk of dropping out than graduating. There was, however, no effect on upward PCT.

> (H5) Financial reasons for a PCT are related to a higher probability of horizontal changes into a different occupation or of downward PCTs

With respect to the training process, we hypothesize that frictions (unsatisfying training quality, conflicts, and excessive demand) increase the probability of downward PCTs or horizontal company changes (H6). This hypothesis is based on the results of Krötz and Deutscher (2022). In addition, frictions in the training process have been demonstrated to be more often raised as reasons by adolescents with rather low qualifications (BIBB 2020; Schöngen 2003) for whom the option of an upward change is simply not accessible. Moreover, Schmid (2010) found that performance and behavior issues affected delayed re-entry into VET.

> (H6) Frictions in the training process (unsatisfying training quality, conflicts, excessive demand) are related to a higher probability of downward PCTs or horizontal company changes

Finally, in cases where trainees cite the prospect of a new training position as the reason for their PCT (BIBB 2020), it is highly plausible that they subsequently end up in a new training company or a new training occupation, with the result that a horizontal PCT occurs (H7).

> (H7) The prospect of a new training position is related to a higher probability of horizontal PCTs (company changes or occupational changes)

Methods

Data

We used data from the Starting Cohort 4 (SC 4, version 12.0.0) of the German NEPS (Blossfeld et al. 2011). SC4 is a longitudinal survey study of German adolescents with the aim of monitoring their educational and employment trajectories from the 9th grade onwards (first interview in fall of 2010). As we are interested in analyzing PCTs, we limited the dataset to adolescents who started their first VET program in the dual system in Germany after leaving general education ($n = 5823$) and ended it prematurely ($n = 949$). In order to measure the dropout direction, sufficient information has to be available for the observation period after PCT. Therefore, only individuals with at least an 18-month observation period after PCT were considered. This observation period was chosen for two reasons. First, due to the panel mortality in the NEPS dataset (Zinn et al. 2020), long observation periods after PCT reduce the dataset. Second, a previous analysis (Michaelis and Richter 2022) demonstrated that major educational or career adaptions occur primarily in the first year after a PCT. Nevertheless, an observation period slightly above 12 months should be chosen, in order to be able to observe re-entries into institutionalized education in the following school year despite temporal fluctuations between school years. Due to this determination the final data set includes 664 individuals.

Dependent variable

The dependent variable measures the dropout direction based on the 18-month trajectories observed after PCT. One advantage of the NEPS dataset is that different activity statuses can be distinguished for each month in a trajectory.[1] For the categorization of dropout directions, we considered the first fully qualifying educational program in VET, general education, or higher education after the PCT. We followed the dropout directions proposed by Krötz and Deutscher (2022). However, based on recent analyses that have demonstrated a need to differentiate between downward and upward PCTs in the context of post-PCT options (Autor:innengruppe Bildungsberichterstattung 2022; Lettau 2017; Michaelis and Richter 2022), we further defined these two directions. As a result, we identified a total of six dropout directions. If adolescents do not return to institutionalized education after the PCT, they are categorized as (C1) *downward PCT into unqualified employment or unemployment* ($n=153$). After a PCT, prevocational programs may be appealing to adolescents in order to avoid disruptions in their life course. The main objective of these programs is reintegration into VET. However, if adolescents remain in prevocational programs for a longer period and do not participate in VET, general education or higher education, we consider such trajectories as (C2) *downward PCT into prevocational program* ($n=65$). For horizontal developments we distinguished two categories, namely (C3) *Horizontal PCT into the same occupation* (i.e., change of training company; $n=103$) and (C4) *into a different occupation* (i.e., change of occupation; $n=244$). Additional categories include *upward PCTs into* (C5) *general education* ($n=58$) and (C6) *higher education* ($n=41$). Therefore, we also differentiate between upward and the downward dropout directions (Krötz and Deutscher 2022) to gain a more nuanced understanding of adolescents' pathways after a PCT.

Independent variables

The first independent variable measured whether the training contract was terminated by the company (=1) or the trainees themselves (=0). We also regarded terminations by mutual agreement as terminations by the trainees themselves, as the decision was also made in the interests of and with consent of the trainee. If trainees terminated the training contract themselves, they were also asked whether the following reasons were behind their PCT on a binary scale (0=no; 1=yes): (a) personal reasons (e.g., illness or pregnancy), (b) not the desired training occupation, (c) financial reasons (current or future earnings), (d) training quality, (e) conflicts, (f) excessive demand, (g) different training position received. Selecting more than one reason was possible (see Table 1 below).

There were 112 missing values in the variable indicating whether the company or the trainee themselves had terminated the training program. However, a conditional relationship existed between self-termination and the reasons for it. To avoid conditional

[1] We used nine activity statuses. First, a distinction was made as to whether a VET program is pursued in (1) the previous occupation or (2) in a different occupation compared to the first VET program. The first case can also be interpreted as a company change (Holtmann and Solga 2023). Adolescents can also pursue educational opportunities that are not part of VET. Here, we identified three further statuses: (3) prevocational programs, (4) general education and (5) higher education. If adolescents did not participate in institutionalized education in a month, we distinguished between (6) unemployment, (7) employment, or (8) other activities (e.g., military service). Finally, there may be individual months with a missing value in the status, which are coded as (9) unknown.

Table 1 Questions about the reasons for PCT

PCT reason	Question
	Training can be terminated for various reasons. Please indicate for each of the following reasons whether it applies to you. I have terminated my training because …
Personal reasons	… I was frequently absent during the vocational training program for personal reasons, for example due to illnesses or pregnancy
Not desired training occupation	… It wasn't my dream job or because the job was different than I had imagined
Financial reasons	… I was dissatisfied with the money I was making in the vocational training program or might earn in the future
Training quality	… I was not being taught enough of what I was actually supposed to be learning in the vocational training
Conflicts	… I was having problems with other people in the vocational training program, such as trainers, teachers, colleagues or other trainees
Excessive demand	… The vocational training was too difficult
Different training position received	… I had obtained or have the prospect of obtaining a new training position

imputation from affecting the overall model and hindering subgroup analyses, the termination background (whether the company or the trainees themselves terminated the training contract) was estimated through multiple imputation by chained equations (n = 30, including all control variables described in the section on control variables). Subsequently, the data set was consolidated in a single data set by determining the modal value of self-termination in the imputed data sets. If at least 50% of the imputations indicated self-termination, the variable was coded as terminated by the trainees themselves. A total of 119 cases were terminated by the company, while 545 trainees terminated their training contract themselves.

Control variables

Previous research has demonstrated that the training process and success are influenced by numerous factors (Böhn and Deutscher 2022). It is well known that a downward PCT into the labor market is more likely for trainees with low qualifications (Holtmann and Solga 2023; Michaelis and Richter 2022). Therefore, we examined whether an adolescent has no or a low school-leaving qualification from general education. To gather detailed information about educational pathways, we considered two variables indicating discontinuities in education. The first measured whether the final school-leaving certificate was obtained in the standard number of years of general education (low school-leaving qualification: 9 years, intermediate school-leaving qualification: 10 years, high school-leaving qualification: 12–13 years). The second variable measured whether adolescents had participated in prevocational programs after completing general education but before starting their first training program. In addition, lower GPAs limit opportunities after a PCT (Holtmann and Solga 2023; Michaelis and Richter 2022). Therefore we also controlled for the impact of a poor GPA (GPA > 3.0) on the last certificate of general education.

Previous research has demonstrated that having a migration background or coming from a low socioeconomic background can impact post-school educational trajectories (Busse et al. 2023; Michaelis et al. 2022). To account for this we included a variable for a migration background (= 1) if the adolescent or at least one parent was born

abroad. For socioeconomic background we followed Michaelis and Richter (2022) and created two variables. The first variable identified low parental education (=1) if "[n]o parent achieved an upper secondary school certificate, a VET or a higher educational qualification." The second variable measured low parental occupational status using the highest parental ISEI-08 score. If this score was lower than two-thirds of all parents in the data set (ISEI-08 ≤ 28.48) parental occupation status was classified as low. Both Schmid (2010) and Michaelis and Richter (2022) demonstrated that low parental education reduces the likelihood of re-entry into VET after a PCT.

Previous research has also demonstrated that PCTs occur more frequently in small companies (Rohrbach-Schmidt and Uhly 2016). Therefore, we checked whether the company size was fewer than 10 employees (=1) in the training program with a PCT. Moreover, it is well known that PCTs in the early stages of VET are more often related to an occupational change after re-entering VET (occupational stopout, Holtmann and Solga 2023; Wydra-Somaggio 2021). Furthermore, Michaelis and Richter (2022) found that longer training durations before PCT increase the probability of a downward PCT into unqualified employment. Thus, we integrated a variable that measured the training duration in months before PCT. We also controlled for sex (female=1). Finally, we controlled for whether the training took place at a training company in an east German federal state (=1), because training and labor market opportunities in east Germany are more restricted (Michaelis and Busse 2021).

Table 2 below presents the distribution of independent and control variables.

Data analysis

We analyzed the influence of different termination reasons on dropout directions from two analytical perspectives. For each perspective, we examined three multinomial logistic regression models. In the first model (M0a) we integrated only the control variables. The second model calculated only the influence of the independent variable/s. The final model (M1) included both the independent and control variables.

The first analytical perspective examined whether there are differences in subsequent trajectories depending on whether the company or the trainee themselves terminated the contract prematurely. For the second analytical perspective, the data set was reduced to those trainees who terminated the training contract themselves. Here, we analyzed whether different reasons influenced dropout directions. We identified average marginal effects (AMEs), which indicate the average changes in probability associated with a certain dropout direction when the independent or control variable increased by one unit. For example, if a dropout reason has an AME of 0.100 for a particular dropout direction, it means that the probability of belonging to that dropout direction increases by an average of 10 percentage points if an individual meets that reason. We interpreted effects up to a 10% significance level due to small category sizes.

As is typical for survey studies, there were missing values in the independent and control variables. Therefore, we utilized multiple imputation by chained equations to estimate these missing values. We followed the recommendations of White et al. (2011). The number of imputed data sets was determined based on the percentage of missing values of the variable with the highest proportion of missing values. This value should be rounded up to the next higher decile. In our data set, the proportions of missing values

ranged from 0 to 21%. Therefore, we utilized 30 imputed data sets. All analyses were conducted using Stata 16. In addition, we tested the robustness of our findings by replicating the analysis without imputing the missing data. Our results were largely consistent, with only minor differences observed when comparing Tables 4 and A1, and Tables 7 and A2 (see Results section and Appendix).

Results

Initiating party and dropout direction

As the results presented in Table 2 demonstrate, PCTs were initiated by the company in only 17.9% of cases, primarily within the first six months of the dual VET program. This can be explained by legal regulations in Germany, as companies can generally only terminate trainees within the probationary period (four months). Table 3 below presents how different dropout directions are connected to the initiating party.

The results of the multinomial logistic regression (Table 4) demonstrate that—under the control of common individual characteristics affecting PCTs—a termination initiated by the training company, was related to a higher probability of a horizontal company change by an average of 10.5 percentage points (Table 4, M1). In addition, an upward PCT into higher education was less likely for PCTs initiated by the training company. The effect was similar for a downward PCT into unqualified employment or unemployment, although this effect is only significant in M0b. This can be explained by a higher share of low-qualified trainees in the group of trainees who were terminated by the company compared to those who terminated the training contract themselves (see Table 2). Therefore, in the majority of cases in which training contracts were terminated by the

Table 2 General characteristics of the sample

	Total sample	Missing values in total sample %	Termination by the company	Termination by trainees themselves
N	664		119	545
No or low school-leaving qualification	48.9%	8.1	58.2%	46.9%
Participation in prevocational program before training	30.0%	0.0	29.4%	30.1%
Graduation after more than the typical number of years	29.1%	11.0	32.4%	28.4%
Poor GPA	44.7%	20.8	51.8%	43.2%
Migration background	27.8%	1.1	23.1%	28.9%
Low parental education	14.3%	11.0	11.8%	14.8%
Low parental occupational status	34.4%	1.1	36.6%	34.0%
Sex (female)	42.7%	0.2	40.7%	43.1%
Training company in eastern federal states	15.3%	0.2	16.2%	15.0%
Company size < 10	35.3%	13.0	40.2%	34.2%
Duration	In months (mean/std.)			
Time spent in first VET program until PCT	9.0/8.3	0.0	6.2/6.8	9.6/8.4

Data not imputed.

Table 3 Dropout directions by initiating party

	n	Downward PCT…		Horizontal PCT		Upward PCT…	
		… Into unqualified employment or unemployment (C1) %	…Into prevocational programs (C2) %	Change of training company (C3) %	Change of occupation (C4) %	… Into general education (C5) %	… Into higher education (C6) %
Total sample	664	23.0	9.8	15.5	36.7	8.7	6.2
Termination by the company	119	17.6	10.9	24.4	36.1	10.1	0.8
Termination by trainees themselves	545	24.2	9.5	13.6	36.9	8.4	7.3

company, adolescents were precluded from entering higher education after a PCT. Consequently, H1 (PCTs initiated by training company are related to a lower probability of horizontal or upward PCTs) is only partially supported. We only found the expected negative effect of companies' dismissals on upward PCTs into higher education. Moreover, H2 is also not supported since, there is no significant effect of termination by the training company on the two types of downward PCT once other factors influencing PCTs are controlled for.

Self-reported reasons for PCT and dropout direction

Table 5 presents descriptive information on the frequencies of reasons for PCTs when trainees terminated training contracts themselves. Most trainees stated that the VET program trained them for an occupation that was not their desired career path (58.4%). Conflicts (49.8%) and concerns about training quality (41.3%) were also commonly cited reasons for PCT. Table 5 illustrates that the reasons for PCT can vary significantly depending on dropout directions. Table 6 presents correlations between different PCT reasons. The results of the multinomial logistic regression (Table 7) are presented below.

In our logistic regression model (Table 7) we found that different types of PCT seemed to be related to different reasons when trainees terminated their training contract themselves. First, personal reasons appeared to be problematic since they were related to a higher probability of a downward PCT into unqualified employment and unemployment by 13.5 to 18 percentage points. This contradicts H3, which posited an increased probability of horizontal PCTs. Moreover, personal reasons were associated with a lower probability of horizontal company changes. In line with H4, we found that individuals were less likely to return to their previous occupation if the training program did not align with their desired occupation. Also in line with H4, the probability of an upward PCT (C5 and C6) was significantly higher—by 5.2 to 9.3 percentage points—when individuals stated that their VET program was not their desired occupation.

If adolescents experienced a PCT due to financial reasons, a horizontal PCT into the same occupation (change of training company, C2) was less likely by 6.8 percentage points (M1, AME: 2.5 percentage points). Moreover, the probability of an upward PCT into higher education was significantly higher (weak effect; M1). However, when comparing this effect with M0b, where the effect is smaller and not statistically significant, one could suspect that financial reasons interact with control variables in this category.

Table 4 Multinomial logistic regression model to measure the impact of initiating party on dropout directions

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment (C1)			…Into prevocational programs (C2)			Change of training company (C3)			Change of occupation (C4)			… Into general education (C5)			… Into higher education (C6)		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Independent Variable																		
Termination by company		− 0.066^	− 0.038		0.014	− 0.014		0.108*	0.105*		− 0.007	− 0.016		0.016	0.024		− 0.065***	− 0.062***
Control Variables																		
No or low school-leaving qualification	− 0.004		0.000	0.119***		0.120***	− 0.004		− 0.012	− 0.019		− 0.017	− 0.008		− 0.010	− 0.084***		− 0.081***
Participation in prevocational program before training	0.071^		0.069^	− 0.002		− 0.003	0.013		0.017	0.030		0.028	− 0.043^		− 0.042^	− 0.070***		− 0.070***
Graduation after more than the typical number of years	0.052		0.052	0.035		0.035	− 0.019		− 0.021	0.002		0.003	− 0.019		− 0.020	− 0.051**		− 0.049**
Poor GPA	− 0.025		− 0.025	0.037		0.038	0.003		− 0.004	0.045		0.044	− 0.049*		− 0.050*	− 0.011		− 0.003
Migration background	− 0.016		− 0.018	− 0.034		− 0.035	0.043		0.049	− 0.008		− 0.010	0.06^		0.061^	− 0.044*		− 0.047**

Table 4 (continued)

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment (C1)			…Into prevocational programs (C2)			Change of training company (C3)			Change of occupation (C4)			… Into general education (C5)			… Into higher education (C6)		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Low parental education	0.271***		0.271***	− 0.028		− 0.028	− 0.065^		− 0.062^	− 0.146*		− 0.146*	− 0.016		− 0.015	− 0.015		− 0.019
Low parental occupational status	− 0.004		− 0.005	0.057*		0.057*	0.041		0.040	− 0.046		− 0.046	0.004		0.003	− 0.051**		− 0.050**
Sex (female)	0.012		0.012	0.014		0.012	0.003		0.006	− 0.010		− 0.011	− 0.018		− 0.018	0.000		− 0.001
Training company in eastern federal states	0.029		0.028	− 0.003		− 0.004	− 0.004		− 0.008	− 0.018		− 0.022	0.006		0.005	− 0.010		0.001
Company size < 10	− 0.003		− 0.002	− 0.015		− 0.015	0.022		0.018	0.029		0.028	− 0.024		− 0.025	− 0.009		− 0.004
Time spent in first VET program until PCT	0.007***		0.007***	− 0.003		− 0.003^	− 0.002		− 0.001	0.000		0.000	− 0.001		0.000	− 0.002^		− 0.003*

The significance levels refer to the AME coefficients: p *** < 0.001, ** < 0.01, * < 0.05, ^ < 0.1; Pseudo R^2: M0a = 0.122, M0b = 0.000, M1 = 0.123; n = 664.

Table 5 Reasons for PCT by trainees who terminated trainings contracts themselves

	PCT initiated by trainees themselves	Downward PCT…		Horizontal PCT		Upward PCT…	
		… Into unqualified employment or unemployment (C1)	…Into prevocational programs (C2)	Change of training company (C3)	Change of occupation (C4)	… Into general education (C5)	… Into higher education (C6)
N	545	132	52	74	201	46	40
Reasons							
Personal reasons	20.7%	35.0%	17.5%	12.7%	17.9%	17.8%	10.3%
Not desired occupation	58.4%	48.4%	46.7%	32.7%	66.1%	81.5%	88.7%
Financial reasons	21.2%	22.8%	16.9%	12.1%	23.0%	20.2%	30.1%
Training quality	41.3%	40.5%	49.0%	48.7%	42.0%	26.0%	34.7%
Conflicts	49.8%	53.5%	57.4%	72.8%	43.9%	40.4%	25.3%
Excessive demand	16.4%	13.8%	26.5%	12.7%	18.0%	22.5%	3.6%
Different training position received	21.1%	10.9%	10.4%	35.0%	30.2%	2.6%	18.5%

Imputed data.

Consequently, H5 (which posited a higher probability of either occupational changes or downward PCTs) was not supported by the results.

In analyzing various aspects of the training process, we identified a significant negative effect on experiencing an upward PCT into general education (C5), which on average becomes 5.4 percentage points less likely if the regression model tested only for the influence of the independent variables (M0b). Conflicts in the first VET program increased the probability of a horizontal PCT into a different training company (C3), while also decreasing the likelihood of a horizontal occupational change or an upward PCT into higher education (C6). If trainees evaluated their first VET program as too demanding, we found a lower probability for upward PCT into higher education (C6), but no significant effects on the other PCT directions. Overall, the results relating to aspects of the training process examined did not support H6. None of the three dropout reasons had the expected impact on downward PCTs, with conflicts being the only factor that increased the likelihood of company changes as hypothesized.

If individuals already have another training position, they are 15.1–17.7 percentage points more likely to experience a horizontal PCT into the same occupation (C3) or a different occupation (C4). Hypothesis 7 is therefore supported. In accordance with these findings, this group is less likely to experience a downward PCT (C1 and C2) or an upward PCT into general education (C5).

Table 6 Correlations between PCT reasons

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Personal reasons	1.000						
(2) Not desired occupation	**− 0.178**	1.000					
(3) Financial reasons	− 0.056	**0.236**	1.000				
(4) Training quality	− 0.056	**0.092**	**0. 156**	1.000			
(5) Conflicts	− 0.057	− 0.075	**0.092**	**0.313**	1.000		
(6) Excessive demand	− 0.048	0.018	− 0.016	− 0.037	− 0.098	1.000	
(7) Different training position received	− 0.067	**0.095**	**0.087**	0.030	− 0.061	0.004	1.000

Imputed data; effects with a $p \leq 0.1$ in bold type.

Discussion

General discussion

Previous studies have demonstrated that a PCT should be viewed as a stage in the life course, since the training process can impact the trajectory after the PCT (e.g. Michaelis and Richter 2022). Building on structural assumptions of post-school transitions and previous research identifying trajectory categories after a PCT (Krötz and Deutscher 2022; Lettau 2017; Michaelis and Richter 2022) we identified six dropout directions: (1) downward PCT into unqualified employment or unemployment, (2) downward PCT into prevocational programs, (3) horizontal PCT: change of training company, (4) horizontal PCT: change of occupation, (5) upward PCT into general education, and (6) upward PCT into higher education. To our knowledge this is the first study to examine the relationship between the initiating party and subsequent trajectories after a PCT. Moreover, it is one of the first studies to analyze how different PCT reasons are connected to dropout directions. This provides a more nuanced understanding of PCTs, which have often been treated homogenously. Since a dismissal by the training company is very likely to impact subsequent trajectories (Schöngen 2003), individual experiences, and well-being (Schmid 2010; Brand 2015), it is crucial to differentiate the initiating party of a PCT. Moreover, self-initiated PCTs are likely the result of a decision-making process where adolescents reflect on reasons and evaluate their options post-PCT (e.g., Dawis and Lofquist 1984; Lamamra and Masdonati 2008). Therefore, a deeper understanding of this process is essential with a view to supporting trainees more effectively.

Regarding the effects of the initiating party, we found that if the training company initiated the PCT, a horizontal change to another company became more likely (contradicting H1), while the probability of an upward PCT decreased (supporting H1). Moreover, there was no significant impact on downward PCTs (contradicting H2). Previous research indicated that terminations by the training company typically stem from performance issues or lack of effort on the part of trainees (Beckmann 2023; Stalder and Schmid 2006) and that downward PCTs are more likely after dismissals (Schöngen 2003). One might therefore have expected that trainees were less likely to continue a

Table 7 Multinomial logistic regression model to measure the impact of reasons for self-termination on dropout directions

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment (C1)			…Into prevocational programs (C2)			Change of training company (C3)			Change of occupation (C4)			… Into general education (C5)			… Into higher education (C6)		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Independent Variables																		
Personal reasons		0.180**	0.135*		− 0.023	− 0.022		− 0.071*	− 0.068^		− 0.043	− 0.025		− 0.006	− 0.002		− 0.036	− 0.018
Not desired training occupation		− 0.074^	− 0.043		− 0.042	− 0.019		− 0.141***	− 0.158***		0.083^	0.080		0.093***	0.088**		0.082***	0.052*
Financial reasons		0.066	0.039		− 0.019	− 0.033		− 0.068^	− 0.067^		0.004	0.007		− 0.007	− 0.007		0.025	0.060^
Training quality		− 0.006	− 0.026		0.035	0.032		0.013	0.026		0.022	0.030		− 0.054*	− 0.050^		− 0.011	− 0.013
Conflicts		0.031	0.039		0.018	0.015		0.110**	0.101**		− 0.072	− 0.087^		− 0.017	− 0.012		− 0.070**	− 0.056*
Excessive demand		− 0.031	− 0.036		0.074	0.051		− 0.031	− 0.031		0.029	0.028		0.032	0.043		− 0.072***	− 0.056*
Different training position received		− 0.135**	− 0.161***		− 0.058*	− 0.045		0.151**	0.157**		0.173**	0.177**		− 0.098***	− 0.102***		− 0.034	− 0.026
Control Variables																		
No or low school-leaving qualification	− 0.005		− 0.029	0.119***		0.109***	0.009		− 0.007	− 0.031		− 0.001	0.004		0.017	− 0.096***		− 0.090***

Table 7 (continued)

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment (C1)			…Into prevocational programs (C2)			Change of training company (C3)			Change of occupation (C4)			… Into general education (C5)			… Into higher education (C6)		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Participation in prevocational program before training	0.070		0.079^	− 0.019		− 0.013	0.006		− 0.015	0.068		0.058	− 0.042		− 0.028	− 0.082***		− 0.080***
Graduation after more than the typical number of years	0.088^		0.086^	0.043		0.039	− 0.017		− 0.019	− 0.028		− 0.018	− 0.029		− 0.027	− 0.057**		− 0.060**
Poor GPA	− 0.037		− 0.045	0.041		0.038	0.019		0.017	0.035		0.049	− 0.048^		− 0.059*	− 0.009		0.000
Migration background	− 0.005		0.018	− 0.036		− 0.029	0.042		0.042	0.004		− 0.024	0.052		0.049	− 0.057**		− 0.057**
Low parental education	0.275***		0.254***	− 0.004		0.002	− 0.035		− 0.033	− 0.189**		− 0.183**	− 0.020		− 0.009	− 0.026		− 0.031

Table 7 (continued)

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment (C1)			…Into prevocational programs (C2)			Change of training company (C3)			Change of occupation (C4)			… Into general education (C5)			… Into higher education (C6)		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Low parental occupational status	0.007		− 0.002	0.039		0.030	0.009		0.015	− 0.003		0.007	0.007		0.002	− 0.057**		− 0.051*
Sex (female)	− 0.018		− 0.045	− 0.009		− 0.011	0.036		0.026	− 0.009		0.023	− 0.002		0.005	0.002		0.002
Training company in eastern federal states	0.015		− 0.005	− 0.006		− 0.016	0.028		0.060	− 0.004		− 0.024	− 0.026		− 0.022	− 0.007		0.007
Company size < 10	− 0.002		0.003	− 0.020		− 0.023	0.029		0.002	0.013		0.029	− 0.022		− 0.017	0.002		0.007
Time spent in first VET program until PCT	0.007***		0.007**	− 0.003^		− 0.003^	− 0.001		− 0.002	0.000		0.000	0.000		0.001	− 0.003*		− 0.002

The significance levels refer to the AME coefficients: p *** < 0.001, ** < 0.01, * < 0.05, ^ < 0.1; Pseudo R^2: M0a = 0.141, M0b = 0.109, M1 = 0.210; n = 545.

training program in the same occupation, with the same demands, after being dismissed by the training company, or were less likely to find a new training company. However, our results did not support this relationship. In terms of young peoples' educational opportunities after a PCT, this outcome is viewed positively, as adolescents succeed in re-entering VET and do not end up in unqualified employment after being terminated by the training company. In order to explain the differences between our findings and earlier findings, more information would be needed on the reasons why training companies terminate trainees' contracts. One possible explanation could be the growing availability of training opportunities, as the challenges of hiring in the German training market are increasing, and communication between companies and those seeking training is becoming more accessible (e.g., through digitalization). Unfortunately, however, the NEPS data set does not contain information on the reasons behind companies' decisions regarding PCTs. It can be assumed that companies decide to terminate training contracts when they believe the training objective cannot be achieved. Future studies, with longer observation periods, should investigate the decision-making process of adolescents in a more nuanced way and determine whether they ultimately complete the VET program in the same occupation and with a different company.

In relation to trainees' self-reported reasons for PCTs that were initiated by themselves we found a significant relationship between personal PCT reasons and downward PCTs into unqualified employment or unemployment (contradicting H3). In addition, the likelihood of continuing the training program in a different training company decreased. This contradicts previous findings by Schmid (2010), where personal reasons increased the likelihood of direct re-entry into VET. Our results suggest that personal reasons can create problematic situations for young adults. Due to challenging private circumstances, adolescents may struggle to successfully follow the VET program started and, as our results suggest, they may also face difficulties in pursuing further educational paths within or outside of VET. Consequently, these adolescents are more likely to end up unemployed or in unqualified employment.

The most commonly cited reason for PCT among trainees was that the training position did not match their desired occupation (occupational mismatch; 58.4%). In cases of occupational mismatches, that occupation is subsequently avoided, and upward PCTs become more likely. Since a horizontal occupational choice was not significantly related to an occupational mismatch once other PCT related factors were controlled for, H4 only holds true for upward PCTs. Overall, the findings relating to H4 suggest that adolescents reflect on wrong career choices and make constructive career adjustment after a PCT. This results in either improving their career opportunities by obtaining better qualifications (upward PCT into general education) or choosing to pursue an academic career. Previous research has demonstrated that trainees with a university entrance qualification are typically the most dissatisfied with their training situation (Michaelis and Findeisen 2022) and often cited their training occupation as a reason for PCT (BIBB 2020). As a result, the trend of upward PCTs into higher education appears to be a viable alternative to VET.

Moreover, we found no support for H5, which posits that financial reasons are related to a higher likelihood of either occupational changes or downward PCTs. Based on the results of Seidel (2019), we expected that financial distress may lead to the necessity of

acquiring a secondary job, thus increasing the probability of downward PCT. Moreover, if adolescents experience financial problems, it seemed reasonable to expect that they would not choose the same occupation again, as this would not improve their financial situation. Instead, an adjustment of career choices based on dissatisfaction with earnings or earning possibilities would seem plausible. Support for this expectation is provided by the result that financial reasons negatively affect the probability of continuing the same training program in a different training company after a PCT. This highlights that if adolescents are not satisfied with their current or future earnings, they may not continue pursuing the same occupation further. The lack of support for our hypotheses may be due to the various different reasons summarized in this question on financial issues. The fact that current earnings are not enough to cover an adolescent's daily expenses (e.g., when trainees do not receive additional financial support from their parents) is different from considering future earning potential, which could lead to changes in career choices. Therefore, a more nuanced evaluation of this possible reason for PCT is necessary and should be taken up in future research.

Regarding H6, we did not find consistent effects on the various aspects of the training process that were examined (conflicts, excessive demands, and training quality). Contrary to our expectations (for H6), none of these factors significantly increased the likelihood of a downward PCT. This is a positive outcome for adolescents, as it indicates that different trajectories can be followed even after a PCT based on suboptimal training conditions. Moreover, it was only in the case of conflicts that we discovered the expected positive effect on horizontal PCT into the same occupation (change of training company), which is in line with H6. The cases in C3 (change of training company) illustrate that conflicts in VET do not necessarily lead to dropout from VET, but rather reinforce the intention to complete the VET program in another company. This means that trainees are able to recognize difficult conditions and make an effort to adjust their situation and to continue the VET program in a different company.

Trainees who found their first VET program too demanding are less likely to pursue higher education (with no significant relation with other dropout directions). This suggests a reluctance to face further excessive demands, potentially limiting their future job prospects. However, if we consider that higher education programs may also pose higher demands on adolescents, it is beneficial that they exercise caution before entering another educational setting with excessive demands after a dropout.

It is surprising though that training quality played such a minor role in explaining the dropout directions that were examined. We identified only a small negative effect on upward PCT into general education. This contradicts the findings of Krötz and Deutscher (2022), where training quality was demonstrated to be an important predictor of the intention of a company change. Our results indicated that this does not hold for actual PCTs and observed trajectories after a PCT. Instead, we found that training quality as a reason for PCT does not significantly impact dropout directions once other influencing factors are controlled for.

Finally, in line with H7, there is a significantly positive relationship between the prospect of a different training position and both horizontal PCT types (change of company and change of occupation). Individuals who have already secured another training position are

less likely to end up unemployed or in unqualified employment or pursue additional general education. This result is highly plausible since the question was framed to focus on different VET positions, leaving the option of a company or occupational change. Since trainees who already had another training position more frequently cited *undesired occupation* and *financial reasons* as reasons for their PCT (Table 5), these results suggest that trainees reflect on their training situation early on and proactively seek alternatives.

Limitations of the study and implications for further research

This study has several limitations that should be considered when interpreting the results. First, we utilized one of the most comprehensive data sets in the context of educational trajectories (NEPS). However, the data set is limited to sometimes small categories in the context of our research questions and contains missing values, affecting the quality of our results and their implications. For example, we were unable to make a more detailed distinction between unemployment and various forms of unqualified employment (category C1) due to the small number of cases in this category. Second, although the data set contains valuable information on the PCT reasons of trainees, each reason was assessed based only on a single item rather than a scale. Moreover, some reasons covered broad areas with various aspects that may affect PCTs differently. This was previously discussed in relation to financial reasons and also applies to personal reasons such as mental health problems, accidents, pregnancy and so forth. As far as conflicts are concerned, different effects may occur for conflicts with trainers or teachers than for conflicts with colleagues or fellow trainees. Moreover, the very broad construct of training quality is covered by only one item in the questionnaire. This may also explain the differences between our results and those of Böhn and Deutscher (2022), as well as the insignificant relationship between training quality and dropout directions. In general, compared to the extensive model of Böhn and Deutscher (2022), the data set we used did not contain detailed information on the various sets of predictors. For example, we were only able to consider very specific aspects of learners, and information on school factors (e.g., performance in vocational schools) is missing entirely. In addition, it would be helpful to further differentiate between personal characteristics upon entry into VET and personal issues that occur during VET (e.g., health problems before starting VET vs. health problems occurring while in VET; care obligations when starting VET vs. pregnancy while in VET).

A limitation that has already been mentioned is the lack of information on training companies' reasons for their dismissals of trainees. Future studies should consider including the training companies' perspective to better understand PCTs initiated by them. In addition, conducting further research to determine whether the training company played a role in the trainee's termination—such as cases where a trainee's resignation was suggested by the training company—would be beneficial.

Furthermore, we examined adolescents' trajectories over an observation period of 18 months. Therefore, we cannot draw any conclusions on the long-term effects of PCTs. As a result, we do not have any information regarding the further course of the trajectory an adolescent follows after a PCT. It would be highly beneficial to obtain more information on whether adolescents are able to successfully complete a second training program that they chose in a different company or a different occupation. Further longitudinal studies with longer observation periods are needed in this regard.

Regarding implications, one finding of this study that should be considered is the increased probability of a downward PCT into unqualified employment or unemployment in cases of personal reasons for PCT. This indicates that young adults who are already facing challenging life situations, such as health issues or care-giving responsibilities (e.g., pregnancy), during their training program are not able to easily return to an educational path after a PCT. If this finding remains consistent over a longer period of time (the observation period in this study was 18 months) it calls for a better support system for adolescents facing personal difficulties in order to improve their individual career prospects and secure additional skilled workers. The fact that personal reasons for PCT are most commonly reported among trainees with low school-leaving qualifications (see also BIBB 2020) highlights the importance of providing additional support to this group in obtaining further qualifications.

As almost 60% of trainees cited occupational mismatches as a reason for PCT, the results suggest that a significant number of PCTs could potentially be prevented by enhancing career guidance for young adults before they begin VET. This is especially crucial in the light of our findings that adolescents who choose PCT to correct their occupational choices are more inclined to pursue further general or higher education, rather than enrolling in another VET program. Since this issue is most prevalent among adolescents with university entrance qualifications (BIBB 2020), the VET system is losing out on well-educated trainees. While this may be attributed to a growing trend towards higher education, offering young adults comprehensive career guidance could assist them in determining whether they are a good fit for a particular VET occupation before starting the training program. This approach could help attract high-performing trainees who are well suited for a VET occupation, while also preventing inefficient investments in trainees who are not a good fit and would prefer to pursue an academic career.

With regard to future research on PCTs in VET, our results emphasize the importance of a thorough assessment of the various dropout directions, especially on the basis of life history data. Moreover, differentiating between trainees' decisions to terminate a training contract and dismissal by the training company is necessary to gain a deeper understanding of the PCT process. Our results demonstrate that the initiating party impacts dropout directions. However, since the effects identified differ from those in existing studies, further research on this relationship is essential. The findings of this study also highlight that PCT reasons and trajectories post-PCTs are connected. Therefore, this study highlights that PCTs are not the result of impulsive actions, but rather involve complex decision-making processes before and after PCT. Research designs that enable a thorough examination of the diverse groups of adolescents with a PCT, as well as their varied subsequent trajectories, are extremely valuable in enhancing our understanding of PCT decisions. This information can provide valuable insights for policy makers, ultimately leading to more effective support for both adolescents and training companies.

Appendix

See Tables 8 and 9.

Table 8 Multinomial logistic regression model to measure the impact of initiating party on dropout directions without imputation

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment			…Into prevocational programs			Change of training company			Change of occupation			… Into general education			… Into higher education		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Independent Variable																		
Termination by company		− 0.058	0.005		0.014	− 0.004		0.115**	0.127*		− 0.029	− 0.023		0.014	− 0.017		− 0.055***	− 0.088***
Control Variables																		
No or low school-leaving qualification	− 0.045		− 0.044	0.096*		0.097*	0.026		0.014	0.042		0.047	− 0.027		− 0.025	− 0.091***		− 0.088***
Participation in prevocational program before training	0.113^		0.112^	− 0.017		− 0.018	− 0.035		− 0.033	0.03		0.029	− 0.011		− 0.012	− 0.08***		− 0.078***
Graduation after more than the typical number of years	0.037		0.038	− 0.012		− 0.011	0.033		0.026	0.025		0.026	− 0.011		− 0.01	− 0.072**		− 0.068**
Poor GPA	− 0.014		− 0.015	0.027		0.027	− 0.037		− 0.048	0.064		0.063	− 0.053^		− 0.053^	0.013		0.026
Migration background	− 0.018		− 0.018	− 0.025		− 0.025	0.028		0.031	0.006		0.005	0.073		0.074	− 0.063*		− 0.066**

Table 8 (continued)

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… Into unqualified employment or unemployment			…Into prevocational programs			Change of training company			Change of occupation			… Into general education			… Into higher education		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Low parental education	0.294**		0.294**	− 0.002		− 0.003	− 0.042		− 0.041	− 0.146^		− 0.146^	− 0.029		− 0.030	− 0.074***		− 0.074***
Low parental occupational status	0.029		0.028	0.047		0.046	0.008		0.004	− 0.036		− 0.038	0.014		0.015	− 0.062*		− 0.056*
Sex (female)	0.021		0.021	0.034		0.034	− 0.027		− 0.019	− 0.016		− 0.018	− 0.017		− 0.018	0.004		0.000
Training company in eastern federal states	− 0.058		− 0.061	0.04		0.039	0.002		− 0.008	0.018		0.013	0.023		0.023	− 0.026		− 0.006
Company size < 10	0.012		0.011	0.016		0.015	0.019		0.020	0.041		0.037	− 0.068*		− 0.069*	− 0.020		− 0.014
Time spent in first VET program until PCT	0.007**		0.007**	− 0.003		− 0.003	− 0.003		− 0.001	0.000		0.000	0.000		0.000	− 0.001		− 0.002

The significance levels refer to the AME coefficients: p *** < 0.001, ** < 0.01, * < 0.05, ^ < 0.1; Pseudo R^2: M0a = 0.101, M0b = 0.010, M1 = 0.116; n = 552.

Table 9 Multinomial logistic regression model to measure the impact of reasons for self-termination on dropout directions without imputation

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… into unqualified employment or unemployment			…into prevocational programs			Change of training company			Change of occupation			… into general education			… into higher education		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Independent Variables																		
Personal reasons		0.172**	0.111		− 0.021	− 0.015		− 0.054^	− 0.077*		− 0.062	− 0.001		− 0.007	0.028		− 0.028	− 0.047
Not desired training occupation		− 0.090*	− 0.030		− 0.044	− 0.019		− 0.114***	− 0.169**		0.075	0.044		0.101***	0.100**		0.072**	0.073*
Financial reasons		0.080	0.037		− 0.029	− 0.031		− 0.050^	− 0.054		− 0.01	0.021		− 0.008	− 0.020		0.018	0.046
Training quality		− 0.011	− 0.101*		0.041	0.048		0.013	0.073		0.023	0.051		− 0.061*	− 0.055		− 0.005	− 0.015
Conflicts		0.034	0.083^		0.028	− 0.010		0.082**	0.029		− 0.066	− 0.009		− 0.017	− 0.032		− 0.062*	− 0.061^
Excessive demand		− 0.038	− 0.077		0.070	− 0.005		− 0.025	− 0.037		0.022	0.085		0.033	0.073		− 0.063**	− 0.040
Different training position received		− 0.130**	− 0.139**		− 0.064*	− 0.055*		0.111*	0.058		0.217***	0.332***		− 0.105***	− 0.128***		− 0.03	− 0.068*
Control Variables																		
No or low school-leaving qualification	− 0.069		− 0.069	0.083^		0.073	0.053		0.018	0.054		0.067	− 0.009		0.017	− 0.112***		− 0.105***

Table 9 (continued)

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… into unqualified employment or unemployment			…into prevocational programs			Change of training company			Change of occupation			… into general education			… into higher education		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Participation in prevocational program before training	0.161*		0.18*	− 0.028		− 0.021	− 0.035		− 0.052	0.025		− 0.007	− 0.024		− 0.002	− 0.099***		− 0.098***
Graduation after more than the typical number of years	0.064		0.044	0.005		0.011	0.04		0.048	0.013		0.026	− 0.035		− 0.037	− 0.087**		− 0.092***
Poor GPA	− 0.035		− 0.048	0.044		0.034	− 0.025		− 0.039	0.053		0.088	− 0.070^		− 0.075*	0.033		0.04
Migration background	0.016		0.027	− 0.047		− 0.048	− 0.015		− 0.008	0.077		0.018	0.054		0.082	− 0.084**		− 0.072*
Low parental education	0.283**		0.292**	0.059		0.046	0.003		− 0.011	− 0.205*		− 0.185*	− 0.045		− 0.046	− 0.095***		− 0.095***
Low parental occupational status	0.032		0.024	0.018		0.024	− 0.01		0.018	0.021		0.02	0.009		− 0.007	− 0.071*		− 0.080**

Table 9 (continued)

	Downward PCT…						Horizontal PCT						Upward PCT…					
	… into unqualified employment or unemployment			…into prevocational programs			Change of training company			Change of occupation			… into general education			… into higher education		
	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1	M0a	M0b	M1
Sex (female)	− 0.021		− 0.039	0.000		− 0.008	0.007		0.002	0.015		0.029	0.001		0.003	0.000		0.013
Training company in eastern federal states	− 0.055		− 0.075	0.034		0.038	− 0.01		0.034	0.069		0.019	− 0.030		− 0.035	− 0.009		0.019
Company size < 10	− 0.016		− 0.013	− 0.007		0.000	0.049		0.045	0.054		0.024	− 0.060^		− 0.052	− 0.019		− 0.004
Time spent in first VET program until PCT	0.007*		0.009**	− 0.004		− 0.004^	− 0.001		− 0.003	0.001		− 0.002	0.000		0.001	− 0.002		0.000

The significance levels refer to the AME coefficients: p *** < 0.001, ** < 0.01, * < 0.05, ^ < 0.1; Pseudo R^2: M0a = 0.116, M0b = 0.104, M1 = 0.227; n = 438.

Acknowledgements
Not applicable.

Author contributions
Christian Michaelis: Conceptualization, Methodology, Data curation, Formal analysis, Writing- Original draft preparation, Writing—Reviewing and Editing. Stefanie Findeisen: Conceptualization, Methodology, Writing—Original draft preparation, Writing- Reviewing and Editing. Both authors contributed equally to the paper and share first authorship.

Funding
No funding was received for this study.

Availability of data and materials
Publicly available datasets were analyzed in this study. This data can be found here: https://www.neps-data.de/.

Declarations

Competing interests
Both authors are guest editors of the thematic series "Dropouts in vocational and professional education". Hence, this submissions was transferred to Stefan Wolter as Editor-in-Chief. The authors have no further conflicts of interest to declare.

Received: 13 January 2024 Accepted: 16 July 2024
Published online: 06 August 2024

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