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ORIGINAL PAPER

Transition from School to Work – Explaining Persistence Intention in Vocational Education and Training in Switzerland

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Abstract

Vocational education and training (VET) programs are typically regarded as the means to enable successful school-to-work transitions. However, high rates of premature contract terminations in VET programs suggest that adolescents face difficulties during this transition. This paper aims to examine the determinants of persistence intention, claiming that persistence intention is a crucial indicator of imminent dropout decisions. The analysis is based on a longitudinal data set of trainees in dual VET programs in Switzerland (n = 1,163) containing two measurement points (before and after the transition from school to VET). Drawing on Social Cognitive Career Theory (Lent & Brown, 2008, 2013), we are interested in the effects of work adjustment indicators, selected characteristics of the vocational choice process, and environmental support before and after the transition on trainees' persistence intention. We use structural equation modeling to analyze both direct and indirect effects of different predictor variables on persistence intention. The results show significantly positive effects of both occupational self-efficacy and perceived person-vocation fit during the training program on trainees' persistence intention. Moreover, there are only indirect effects of anticipated person-vocation fit and occupational self-efficacy at the end of compulsory education. Trainees' relationship with the trainer also has an indirect effect on persistence intention. Social integration in the workplace is both directly and indirectly linked to persistence intention. Overall, the model explains 48% of the variance in persistence intention. Implications for VET programs and future research are discussed.

Keywords Persistence intention · Vocational education · Person-vocation fit · Social cognitive career theory · Transition from school to work · Environmental support

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Transition from School to Vocational Education

The transition from school to work is an important step for adolescents, as it requires career-related decisions that determine future career success (Richards, 1984; Savickas, 1999). At the end of compulsory education, adolescents are faced with the task to search for a career that matches their interests, abilities, and values (Lent & Brown, 2013). Upon labor market entry, adolescents face work adjustment processes (Lent et al., 1999; Ng & Feldman, 2007; Savickas, 1999), where they try to achieve (and maintain) congruence with their work environment.

In countries with strong traditions of vocational education and training (VET) programs such as the German-speaking countries in Europe, adolescents can choose between different educational tracks at the upper secondary level. Vocation-specific qualifications are acquired in VET programs. In Switzerland, which is the focus of our study, the VET system includes both dual vocational programs (company-based practical education combined with theoretical education in vocational schools) and full-time school programs (for a detailed description of the different tracks of (vocational) education in Switzerland see e.g. Jüttler, Schumann, Neuenschwander & Hofmann, 2021). Approximately two-thirds of Swiss adolescents attend a form of vocational education after compulsory school; 80% of adolescents in the vocational track choose a dual training program (SCCRE, 2018). Hence, a large share of Swiss adolescents begins the transition from school to work at the end of compulsory education when they start a training program (Masdonati, 2010; Stalder & Nägele, 2011). Therefore, adolescents make career decisions at a relatively young age, which also has consequences for career-choice readiness (see e.g. Hirschi, 2011). Career-choice readiness is significantly related to individuals' well-being (e.g., self-esteem, life satisfaction) and social integration (Creed et al., 2005; Skorikov, 2007). Since adolescents' career-choice readiness has been shown to increase over time (Hirschi, 2011), early career choices could potentially be disadvantageous.

In Switzerland, VET programs are prestigious and provide a solid base for a successful professional career (Scharenberg et al., 2016). Due to their positive reputation, VET programs have typically been regarded as a means to enable successful school-to-work transitions. However, like all transitions, the transition from school to VET does not come without challenges (see e.g., Stalder, 2012), which are clearly illustrated by high rates of premature contract terminations in VET that are regularly reported for both Switzerland (26%, Bundesamt für Statistik, 2019) and other German-speaking countries with long-standing traditions of VET programs (Austria: 16.9%, Dornmayr & Nowak, 2019; Germany: 26.5%, BIBB, 2020). Although premature contract terminations might also be a means of improving trainees' situation (e.g., adjusting vocational choices, improving person-organization fit); approximately 75% of adolescents continue a new training program after termination (Neuenschwander & Stalder, 1998), for individuals, terminations can lead to uncertain conditions and can be connected to an experience of failure. This is especially true if premature terminations are not

initiated by the trainees themselves. Moreover, premature contract terminations produce unnecessary costs for training companies and administration (Forsblom et al., 2016) and reflects an inefficient allocation of resources. Similar rates of premature contract termination in Germany (whose VET system is comparable to the Swiss system), suggest that high termination rates are rather inherent in the VET system than specific for the Swiss VET system. Nevertheless, the fact that one quarter of adolescents at the transition from school to VET do not complete this transition successfully warrants a closer examination.

Given this background, this paper aims to examine the persistence intention of trainees in Swiss VET programs (i.e., trainees' intention to complete the training program). Hereby, we focus on dual VET programs, due to their important role in the transition from school to work for the majority of Swiss adolescents. Studies examining persistence intention in other contexts (e.g. higher education) frequently draw on Social Cognitive Career Theory (SCCT) (e.g., Lent et al., 1994, 2013), which provides a valuable framework to examine relevant predictors. In our study, we aim to examine the model's applicability in VET programs, while analyses thus far have mainly concentrated on higher education contexts. Moreover, we applies the SCCT to the transition from school to VET, adding to prior research, where longitudinal applications of the SCCT have – to our knowledge – only been done within one educational context and have rarely been applied to transitions. With respect to the transition from school to VET, we are specifically interested in the effects of career decisions and work adjustment processes on persistence intention. Both processes are expected to affect persistence intention since, for instance, the fit between an individual and her/his occupation is determined by the process of vocational choice and becomes apparent during work adjustment. Person-vocation fit is one factor that is typically regarded as crucial for premature contract termination in VET programs (Stalder, 2012). However, little research explains the extent to which career decision outcomes and characteristics of the work adjustment process predict the intention to terminate training contracts prematurely.

This paper is structured as follows: In Sect. 2 we introduce the theoretical background and empirical evidence relevant for our study. We introduce an integrative SCCT model that forms the basis of our analysis. We than state research questions and hypotheses (Sect. 3) and explain the research design as well as the data analysis approach (Sect. 4). Section 5 reports the results of the structural equation model examined. The results are discussed with regard to implications for both research and practice in Sect. 6.

Persistence Intention, Career Decisions and Work Adjustment

An Integrative SCCT Model

To explain persistence intention, studies in the field of career research often refer to Social Cognitive Career Theory (SCCT). SCCT was introduced in the 1990s, and over the years, several overlapping SCCT models have been developed (Brown & Lent, 2019). As our study focuses on the effects of career decisions and work adjustment

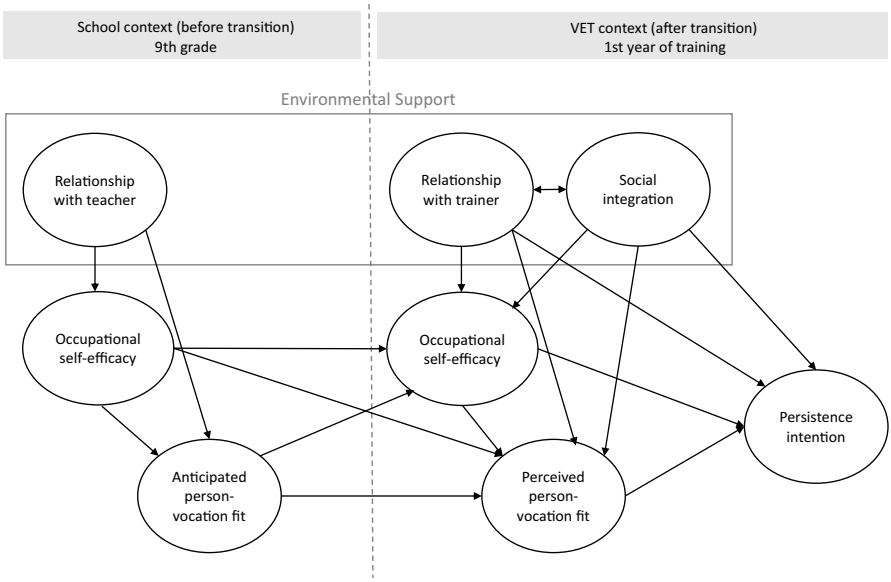

Fig. 1 Hypothesized relationships between indicators of vocational choice, work adjustment processes, and persistence intention

processes, the models relevant to our study are the social cognitive model of career self-management (Lent & Brown, 2013) and the social cognitive career theory of work adjustment (Lent & Brown, 2008). Since we are specifically interested in transitions, which is typically not the focus of prior studies on SCCT, fur the purpose of our study it was necessary to integrate the two models mentioned above. The combined model that is adapted to our study is depicted in Fig. 1. This integrative SCCT model allows us simultaneously analyze effects of career decision outcomes and work adjustment indicators on persistence intention.

Persistence intention can be regarded as trainees' intention to complete their training program and is often used as an indicator of imminent dropout decisions. In fact, empirical evidence points towards a link between dropout intention and actual dropout in the context of higher education programs. For instance, Deuer and Wild (2018) show that dropout intentions predict 59 percent of actual dropouts, and Lent et al. (2016) find a significant path coefficient from intended persistence to actual persistence ($\beta = 0.29$). Hence, we regard persistence intention as an indicator of trainees' persistence in the training program. It is plausible to assume that persistence intention is positively predicted by indicators of the work adjustment process (right part of Fig. 1) as well as career decision outcomes (left part of Fig. 1). The two processes of interest to our study and the relationships between different model indicators are discussed in Sects. 2.2. to 2.4.

Work Adjustment

When entering an organization and starting work as a trainee, adolescents face work adjustment processes (Lent et al., 1999; Saks, 2018). During the work adjustment process, individuals try to achieve (and maintain) congruence with their work environment. Individuals' satisfaction depends on their needs being met by the work environment. It is assumed that incongruence negatively affects performance and satisfaction and increases turnover intention (Dawis & Lofquist, 1984). The SCCT of work adjustment relates job satisfaction to self-efficacy, expected and received work conditions and outcomes, as well as environmental support (Lent & Brown, 2008). Our study focuses on two indicators of a successful work adjustment process at the beginning of VET programs[1]: occupational self-efficacy and person-vocation fit. Moreover, we examine the effect of environmental support during the work adjustment process.

Occupational self-efficacy can be regarded as "personal beliefs about one's ability […] to perform tasks required for success in one's work environment" (Lent & Brown, 2008, p. 14). Individuals with high self-efficacy believes engage in difficult tasks, which they perceive as challenges instead of avoiding them. They are better equipped to deal with failures and setbacks (Bandura, 1994). As such, self-efficacy is expected to predict persistence intention. Self-efficacy develops, for instance, through mastery experiences. However, social persuasion can also foster self-efficacy. Individuals are more likely to put greater efforts into difficult tasks and overcome problems, if they are encouraged and persuaded by others that they can master certain tasks (Bandura, 1994). Consequently, environmental support during the training program is expected to foster trainees' self-efficacy (see below).

Person-vocation fit describes "the congruence between individuals' interests and abilities and the characteristics and requirements of their vocation" (Vogel & Feldman, 2009, p. 70). The SCCT states that person-vocation fit (interest congruence)[2] leads to persistence, claiming that individuals tend to stay in an environment where they can pursue their interests (Lent et al., 2013). It is also expected that fit perceptions influence work adjustment behaviors. High perceptions of person-vocation fit are likely to foster proactive behavior of job starters (e.g., asking for feedback, developing networks with co-workers) (Saks, 2018). Hence, the theory assumes person-vocation fit to positively predict persistence intention.

The positive effect of self-efficacy on persistence intention is well documented in empirical studies related to SCCT (Lent et al., 2013, 2015; Navarro et al., 2019); however, evidence on the relationship between interest congruence and persistence is less clear. In line with the assumption stated above, empirical findings indicate that perceived person-vocation fit predicts job satisfaction, organizational commitment,

[1] Please note that our study only examines selected predictors of persistence intention (selection based on SCCT). Other predictors that have been shown to influence persistence intention include, for instance, individuals' commitment (see e.g. Strom & Savage, 2014; Zembrodt, 2021).

[2] SCCT typically refers to the construct of *interest* which is defined as the compatibility of one's interest (interest congruence) to the environment that the individual is in (e.g., academic program, work context), and is, therefore, closely related to the notion of perceived person-vocation fit used in our model.

and intention to quit (Saks & Ashforth, 1997, 2002). Perceived person-vocation fit mediates the effect of career planning on these outcome measures (see also Neuenschwander & Hofmann, 2021). Moreover, for a sample of industrial clerks and technical trainees, Volodina et al. (2015) find that certain dimensions of vocational interests (assessed by the RIASEC model of Holland, 1997) significantly affect trainees' satisfaction as well as their intention to terminate their training contract prematurely. In the context of higher education, some studies also identify significant relationships. For instance, Lent et al. (2005) find a small significant effect of interest congruence on persistence, and Navarro et al. (2019) identify a significant link between the two constructs for a certain subsample of engineering students (Latinas/Latinos at predominantly white institutions). However, in a study with students at the early stage of their engineering program, Lent et al. (2013) find that the data do not support the direct effect of interest congruence on persistence intention. Instead, the results suggest that interest congruence only indirectly affects persistence intention through satisfaction. Similar results are obtained in other studies (Lent et al., 2015; Navarro et al., 2014).

During the process of work adjustment, new employees are gradually integrated into the working group (Lave & Wenger, 1991). Social integration refers to the relationships developed between newcomers and their co-workers as well as newcomers' acceptance in the work group (Bauer et al., 2007; Kammeyer-Mueller & Wanberg, 2003). Social integration also affects the amount of social support and assistance that a newcomer receives by his/her colleagues when performing work tasks (Kammeyer-Mueller & Wanberg, 2003). In line with Lent and Brown (2008), environmental support is an important factor during work adjustment. When starting a new job, perceived support helps employees adjust more easily to the new situation (Perrot et al., 2014). At the same time, social integration may foster individuals' perception of fit to their new role and work environment (Moreland & Levine, 2001; Reichers, 1987). Integration into the group of co-workers is expected to establish situational identity and, in turn, identity with the new organization (Reichers, 1987).

Empirical results show that social integration is related to job satisfaction, commitment, and low turnover intentions (Bauer et al., 2007; Kammeyer-Mueller & Wanberg, 2003). For the context of VET, training conditions (e.g., support from trainers, conflicts with trainers or colleagues) are typically viewed as important factors influencing trainees' decision to terminate their contracts prematurely (Stalder, 2012). A positive relationship with the trainer and successful social integration is expected to support trainees in overcoming uncertainties related to the new training program and provide access to relevant resources (Nägele & Neuenschwander, 2016). Empirical evidence demonstrates the importance of support for persistence in higher education (direct effects: Navarro et al., 2019; indirect effects: Lent et al., 2013; Lent et al., 2015). For VET programs, Negrini et al. (2016) show for a sample of Swiss trainees that high training quality can help prevent premature contract terminations. Findings of studies based on the SCCT also show that indicators of environmental support affect self-efficacy (e.g.Lent et al., 2013, 2015; Navarro et al., 2019). Evidence on the relationship between environmental support and person-vocation fit is, again, less clear. However, prior studies report medium-sized correlations between the two constructs (e.g., $r = 0.36$, Lent et al., 2013; $r = 0.30$, Navarro

et al., 2014) and – partly – indirect links of support indicators to interest congruence (Lent et al., 2015).

Finally, few studies are examining actual persistence rather than persistence intention. For instance, Lent et al. (2016) examine engineering students' actual persistence in the study program using a longitudinal design. They find that actual persistence after six semesters is predicted by persistence intention, satisfaction, and self-efficacy in the second semester. Social support and interests are positively related to persistence through academic satisfaction.

Career Decision Outcomes

The transition from school to work is proceeded by an extensive preparatory period that occurs during general education programs. Adolescents' navigate tasks related to the process of vocational choice (e.g., career exploration, identification of one's interests, forming vocational goals) before they conduct an actual job search (Lent & Brown, 2013; Lent et al., 1999; Saks, 2018).[3] During the process of vocational choice, adolescents search for a career that matches their interests, abilities, and values (Lent & Brown, 2013). Consequently, we regard person-vocation fit as a decisional outcome and as an indicator of the quality of the vocational choice process that typically happens during compulsory education. Person-vocation fit is theoretically expected to affect satisfaction and stability (Holland, 1997).

According to the SCCT of self-management, the process of vocational choice is facilitated by social cognitive factors, especially self-efficacy (Lent & Brown, 2013). Individuals with favorable self-efficacy beliefs are more likely to enact and sustain the process of vocational choice. Moreover, self-efficacy is also expected to affect outcomes, as it helps individuals organize their actions and overcome challenges. In addition, the process of vocational choice is expected to be positively affected by environmental support. The SCCT model of career self-management claims that adolescents who experience environmental support are more likely to engage in adaptive career behaviors (here: vocational choice). The theory suggests both direct and indirect relationships: Environmental support is assumed to promote goals and actions directly and strengthen self-efficacy (Lent & Brown, 2013). During general education, environmental support, among others, is provided by teachers. Teachers are expected to potentially support and guide students during career decision processes.

[3] In certain aspects, the process of vocational choice when deciding for a VET program does not differ from other career decision processes (e.g. deciding on a higher education program). However, adolescents are typically younger when they choose a VET program, which, for instance, enhances the role of parents during vocational choice processes (e.g., Boockmann et al., 2020). Another particularity for the transition to VET is the central importance of internships. In Switzerland, practical internships are a central part during career exploration processes of young adults. They are regarded as the most valuable instrument of the vocational choice process by adolescents (Neuenschwander, Hofmann, Jüttler & Schuman, 2018; Neuenschwander & Schaffner, 2010) and also regularly used as part of the selection process by training companies (Schweizerisches Dienstleistungszentrum Berufsbildung, 2018).

Empirical evidence supports the significant role of self-efficacy. In a study among engineering students, Lent et al. (2015) show that self-efficacy significantly predicts interest congruence. Similar results are obtained by Navarro et al. (2019). Moreover, there is empirical support for the positive relationship between general indicators of environmental support (e.g., friends, advisors) and self-efficacy (Lent et al., 2015; Navarro et al., 2019). Specifically, for teacher support, findings show significantly positive relationships with adolescents' self-efficacy and vocational outcome expectations (Ali & McWhirter, 2006; Metheny et al., 2008). Moreover, Neuenschwander and Gerber (2014) find that the relationship with the teacher significantly affects adolescents' anticipated person-vocation fit at the end of compulsory education and before the transition to VET.

Finally, empirical evidence indicates that the quality of individuals' vocational choice process is actually related to finding employment that fits with their competence and interests. Saks and Ashforth (2002) show that the intensity of job search behavior is related to both pre-entry and post-entry perceptions of fit for a sample of university graduates. The results also demonstrate that pre-entry and post-entry fit perceptions are significantly related. Based on the analysis of autoregressive paths in SCCT models, longitudinal studies also point towards a certain stability of both interest congruence and self-efficacy (Lent et al., 2015; Navarro et al., 2014). For the context of VET, Nägele and Neuenschwander (2015) also find for Swiss trainees that anticipated person-vocation fit before the training program is a significant predictor of perceived person-vocation fit during the training program. They also show that person-vocation fit measured prior to the training program predicts training satisfaction and the intention to complete the training indirectly via perceived person-vocation fit during the training program.

Relationship Between Self-Efficacy and Interest

In the literature on SCCT, there is an ongoing discussion about the relationship between self-efficacy and interest (chicken-and-egg situation; see, e.g., Nauta et al., 2002). Career interests and self-efficacy have been shown to be distinct yet related constructs (Nauta et al., 2002). Generally, SCCT claims that self-efficacy predicts interests, as the experience of self-efficacy when performing a certain activity is expected to foster individuals' interest in that activity. However, the theory suggests that reciprocal relationships also seem plausible (Lent et al., 1994). Empirical evidence lends support to both relationships. The results of several studies point towards a unidirectional effect from self-efficacy to interest (Lent et al., 2008, 2015; Navarro et al., 2014), while others find support for reciprocal paths (Lent et al., 2010; Nauta et al., 2002). Except for the study of Nauta et al. (2002), each of the reported studies focuses on one university program (engineering) and assesses interests in relation to this program. Hence, the variable *interest* is operationalized as interest congruence. Nauta et al. (2002) include students from different fields of study and determine both interests and self-efficacy according to the RIASEC model (Holland, 1997).

The Present Study

The present study aims to explain the persistence intention of trainees in dual VET programs in Switzerland (i.e., their intention to complete the training program). In a longitudinal study with two measurement points (before and after the transition from school to VET), we examine the extent to which (1) indicators of work adjustment, (2) selected characteristics of the process of vocational choice (t_1), and (3) environmental support before and after the transition (t_1 and t_2) predict trainees' persistence intention in VET programs. We focus on trainees in dual VET programs only, i.e. on adolescents who are trained in a company (accompanied by theoretical input in vocational schools). Trainees participating in school-based vocational programs are excluded from the study. We use an adapted version of the SCCT (Fig. 1). Measures of environmental support are related to the current stage of the individuals. Hence, before the transition (9th grade of general education), we include the relationship with the teacher (referring to the teacher responsible for the individual's class); during VET, we include the relationship with the trainer and social integration. We regard anticipated person-vocation fit as well as occupational self-efficacy at the end of compulsory education as decisional outcomes of the vocational choice process.

The paper applies the SCCT to the transition from school to VET, adding to prior research in the following two ways. First, longitudinal applications of the SCCT have – to our knowledge – only been done within one educational context and have rarely been applied to transitions. Second, we examine the model's applicability in VET programs (and for a much younger group of employees), while analyses thus far have mainly concentrated on higher education contexts. Moreover, our work adds to the discussion on reasons for dropout intention in VET programs using longitudinal data of trainees in Switzerland.

Based on the SCCT and the findings reported above, we aim to examine the following relationships (see Fig. 1, Sect. 2). The main aim of this study is to explain persistence intention of trainees. First, we expect self-efficacy and perceived person-vocation fit after the transition to VET to directly predict persistence intention. Both relationships are theoretically supported by SCCT (see Sect. 2.1). However, only the effect of self-efficacy has been repeatedly documented in empirical studies (e.g.Lent et al., 2013, 2015), while there is only weak support for the effect of person-vocation fit on persistence intention (Navarro et al., 2019). For the latter, most studies only find indirect effects (e.g.Lent et al., 2013, 2016). Hence, it is still of interest to see which relationship can be found in the context of VET.

(H1) Persistence intention in the VET program (t_2) is affected by (a) occupational self-efficacy as well as (b) perceived person-vocation fit during the VET program (t_2).

We hypothesize both direct and indirect effects on persistence intention regarding the indicators of environmental support during VET (relationship with the trainer, social integration). The direct effects are expected based on the positive effects of the support indicators reported in Sect. 2.2. However, certain mediation

effects seem also plausible, as environmental support has also been shown to affect self-efficacy and – partly – interest congruence (see also Sect. 2.2).

(H2) The relationship with the trainer during VET (t_2) is both (a) directly and (b) indirectly related to persistence intention.
(H3) Social integration during VET (t_2) is both (a) directly and (b) indirectly related to persistence intention.

To examine the transitional process more thoroughly and explain certain direct effects on persistence intention, we also examine selected indirect effects from indicators before the transition on persistence intention. First, it seems plausible to expect indirect effects from the characteristics of the process of vocational choice before the transition (occupational self-efficacy (t_1), anticipated person-vocation fit (t_1)). While these variables predetermine occupational self-efficacy and perceived person-vocation fit during VET, they are not expected to directly influence persistence intention. They refer to expectations rather than actual training conditions (see also the results reported by Nägele & Neuenschwander, 2015). Hence, we postulate the following mediation hypotheses:

(H4) Occupational self-efficacy before the transition to VET (t_1) is indirectly related to persistence intention through occupational self-efficacy during VET (t_2).
(H5) Anticipated person-vocation fit before the school-to-work transition (t_1) is indirectly related to persistence intention through perceived person-vocation fit during VET (t_2).

These hypotheses also examine the stability of the constructs occupational self-efficacy (H4) and person-vocation fit (H5). While a certain stability can be expected (e.g.Lent et al., 2015; Navarro et al., 2014; Saks & Ashforth, 2002), it is still of interest to analyze how stable the constructs actually are at the transition from school to VET.

Moreover, we hypothesize that environmental support before the transition (relationship with the teacher at t_1) is only indirectly linked to persistence intention through its relation to self-efficacy (e.g.Ali & McWhirter, 2006; Lent et al., 2013, 2015; Metheny et al., 2008).

(H6) The relationship with the teacher (t_1) produces an indirect path to persistence intention via occupational self-efficacy before the school-to-work transition (t_1) and occupational self-efficacy during VET (t_2).

Finally, an examination of cross-lagged effects between self-efficacy and person-vocation fit is of interest as well (see the chicken-and-egg discussion regarding self-efficacy and interest congruence in Sect. 2.4). Based on the results reported in Sect. 2.4, it is not quite clear whether to expect unidirectional or reciprocal effects. Hence, we examine the following two hypotheses:

(H7) Occupational self-efficacy during the VET program (t_2) is affected by anticipated person-vocation fit (t_1).
(H8) Perceived person-vocation fit during the VET program (t_2) is affected by occupational self-efficacy (t_1).

Method

Design and Sample

The data set stems from a longitudinal study on the transition from school to work in the German-speaking part of Switzerland (see, e.g., Neuenschwander & Hofmann, 2021). In an online questionnaire, 9th-grade students were asked about their plans after the end of compulsory education. They reported characteristics of the vocational choice process, occupational self-efficacy, and indicators of environmental support. All individuals were invited to participate in the online survey again after approximately one year – hence, at the end of their first year in the VET program (t_2). For the analyses presented in this paper, out of all individuals participating in 9th grade (t_1), we selected those who indicated they would start a dual apprenticeship in the VET sector after graduation ($n = 1{,}183$). Based on the information provided in t_2, we then excluded trainees who changed their training program or their educational track after the transition ($n = 20$). As for these trainees, the data reported at t_1 (e.g., anticipated person-vocation fit) do not refer to their current situation. The selected sample consists of $n = 1{,}163$ trainees. Although participation at t_2 was considerably lower, as only a subset of t_1 participants took part in the survey again ($n = 370$), we based the sample selection on participants choosing a vocational track at t_1. The resulting missing data are handled accordingly (see Sect. 4.3.1). We also carried out robustness checks for each analysis based on the t_2-sample, resulting in comparable results.[4] Hence, using the t_1-sample for the analyses seems justified.

At the second measurement point (t_2), the trainees are on average $M = 16.94$ years of age ($SD = 0.66$) and attend different company-based VET programs, most of them in small- or medium-sized companies. 494 of them are female.

Instruments

To assess the constructs of interest, different scales were used. The answer format for each measure was a 6-point Likert scale (*1: does not apply at all*; *6: does fully apply*). Table 1 presents item examples and descriptive statistics for each construct.

[4] In detail, we performed all procedures described in Sect. 4.3 also for the reduced sample. The results revealed a satisfying fit of both the measurement model and the complete model (with the exception of a decline of the CFI to .933). Most importantly, all effects in the path model (Fig. 2) based on the reduced sample are comparable in size; however, some effects fail to become significant (effect of social integration on persistence intention: $\beta = .115$; $p = .256$; effect of occupational self-efficacy (t2) on persistence intention: $\beta = .247$; $p = .063$).

All reliability measures were satisfying (Cronbach's $\alpha \geq 0.70$). Correlations between the constructs are shown in Table 2.

Occupational self-efficacy was measured based on the German version of the scale by Rigotti et al. (2008) at both measurement points using only slightly different phrasing regarding either the future or the present work situation.

Similarly, *anticipated person-vocation fit* and *perceived person-vocation fit* were assessed using the same instrument (Nägele & Neuenschwander, 2014) framed slightly differently. At t_1, individuals reported their anticipated fit regarding the chosen occupation that they would be trained in after compulsory education, and at t_2, fit referred to their current training profession.

As environmental support measures, we assessed adolescents' *relationship with the teacher* during compulsory education based on an instrument by Neuenschwander et al. (2012). At the second measurement point, we examined trainees' *relationship with the trainer* using a scale by Neuenschwander et al. (2012). To assess *social integration*, a four-item scale was used (Morrison, 2002; Neuenschwander et al., 2013).

Finally, the construct *persistence intention* is based on a three-item measure assessing the intention to complete the training program (Neuenschwander et al., 2013).

Table 1 Scales and descriptive statistics

Scale (number of items)	Item example	M	SD	α
Measurement point 1				
Relationship with the teacher (5)	I have a good relationship with my teacher	4.54	1.15	.91
Occupational self-efficacy (6)	When I encounter a problem at work, **I will usually have** several ideas on how to deal with it	4.54	.70	.88
Anticipated person-vocation fit (5)	**The chosen occupation** matches my personal interests	5.27	.69	.89
Measurement point 2				
Relationship with the trainer (5)	My trainer supports me in case of problems in the company	4.81	.91	.87
Social integration (4)	My co-workers accept me	5.01	.85	.83
Occupational self-efficacy (6)	When I encounter a problem at work, **I usually have** several ideas on how to deal with it	4.51	.64	.82
Perceived person-vocation fit (5)	**My current training situation** matches my personal interests	5.06	.75	.83
Persistence intention (3)	I am determined to complete my apprenticeship	5.45	.71	.72

Table 2 Correlations between different constructs

Variable	1	2	3	4	5	6	7	8
1 Relationship with teacher (t_1)	-							
2 Occupational self-efficacy (t_1)	.18**	-						
3 Anticipated fit (t_1)	.07*	.29**	-					
4 Relationship with trainer (t_2)	.04	-.07	.07	-				
5 Social integration (t_2)	.08	.05	.15*	.40**	-			
6 Occupational self-efficacy (t_2)	.05	.24**	.26**	.31**	.34**	-		
7 Perceived fit (t_2)	.04	.09	.27**	.40**	.44**	.57**	-	
8 Persistence intention (t_2)	-.01	.02	.11	.26**	.33**	.39**	.49**	-

*** $p < .001$, ** $p < .01$, * $p < .05$

Data Analysis

Procedure

We applied structural equation modeling using Mplus Version 8 (Muthén & Muthén, 1998–2017). Over all relevant variables, the share of missing values ranges from 2.6% to 76.0% ($M = 46.3\%$; $SD = 34.4$). Hence the missing data pattern is *multivariate* (several variables with missing data) and – as usual for longitudinal studies with dropouts – *monotone* (for dropouts, missings occur in t_2-variables). As there are 236 complete cases, the pattern of missing data can be described as *connected* (see van Buuren, 2018). In order to gain more information about the missing data mechanisms in our data set, we applied the MCAR test by Little (1988) (SPSS, Version 27), which tests the null hypothesis that the missing data is Missing Completely At Random (MCAR). Based on the results, the missing data patterns cannot be expected to be missing completely at random ($\chi^2(1843) = 2102.288$, $p = 0.000$). However, we expect the data to be missing at random (MAR), since there is no indication of systematic missings. We make the reasonable assumption that the largest amount of dropout occurred due to a lack of encouragement to participate in the study. While the teacher encouraged 9th-grade students to participate in t_1, there was no such encouragement in t_2. Hence, adolescents who did not want to or did not find the time for participation dropped out of the sample.

To account for missing data, we used the full information maximum likelihood (FIML) procedure (Jia & Wu, 2019). A recent simulation study on the assessment of measurement invariance across groups (Liu & Sriutaisuk, 2021) supports this choice as the results show that the FIML procedure performs better than multiple imputation procedures. Analyses are based on the robust maximum likelihood (MLR) estimator for metric, nonnormal data (Boomsma & Hoogland, 2001). Regarding model fit, we rely on the indicators CFI, RMSEA, and SRMR, applying typical conventions (e.g.Boomsma, 2000; Hu & Bentler, 1998, 1999): $CFI \geq 0.95$, $RMSEA \leq 0.06$, and $SRMR \leq 0.09$. In addition, we report χ^2 values since these are generally used for the comparison of two models. Following Herting and Costner (2000), we applied a two-step strategy. In the first step, we examined the measurement model. We

evaluated the measurement invariance for the variables measured at both t_1 and t_2 (occupational self-efficacy and person-vocation fit; see Sect. 4.3.2). In a second step, we examined the hypotheses stated in Sect. 3 in a structural equation model (see Sect. 4.3.3). The results are reported in Sect. 5.

Analysis of the Measurement Models

The analysis of the measurement model showed that factor loadings for all items were significant ($p < 0.001$) and substantial in size (≥ 0.50). In the model, we allowed for diachronic correlations between measurement errors for the repeatedly measured constructs (occupational self-efficacy, person-vocation fit, and relationship with the teacher/trainer). Based on modification indices, we modeled two additional measurement error correlations between items of the scale for occupational self-efficacy. The baseline measurement model reached the following fit indices: $\chi^2 = 1133.32$ ($p < 0.001$, $df = 656$), $CFI = 0.961$, $RMSEA = 0.025$, $SRMR = 0.050$. To examine measurement invariance, we first checked for configural invariance, which can be assumed due to a constant factor structure over both time points. Second, we compared the baseline model to a model where we restricted all factor loadings for the items of the scale person-vocation fit across the two measurement points to be equal. For the comparison, we used the Satorra-Bentler scaled χ^2 difference test (*TRd*), recommended for MLR estimates and nonnormality (Satorra & Bentler, 2010). The results revealed no significant decline regarding model fit ($TRd(4) = 5.280$, $p = 0.260$). Hence, the assumption of metric invariance holds for the construct person-vocation fit. However, additionally equating all factor loadings for the construct occupational self-efficacy led to significantly worse fit compared to the baseline model ($Trd(9) = 18.859$, $p = 0.026$). Only partial metric invariance can be achieved for occupational self-efficacy, equating factor loadings for four out of six items ($TRd(7) = 9.175$, $p = 0.240$). The same is true for the construct relationship with the teacher/trainer. Here, fixating factor loadings for all five items leads to a significant decline in model fit ($TRd(7) = 29{,}738$, $p = 0.002$). By only equating factor loadings for four out of six items, partial metric invariance can be achieved for this scale as well ($TRd(10) = 14{,}770$, $p = 0.141$). Hence, a measurement model with metric invariance for person-vocation fit and partial metric invariance for both occupational self-efficacy and relationship with the teacher/trainer is used for all subsequent analyses. This measurement model reached satisfactory fit indices: $\chi^2 = 1147.275$ ($p = 0.000$, $df = 666$), $CFI = 0.960$, $RMSEA = 0.025$, $SRMR = 0.054$.

Analysis of the Structural Model

In the structural model, we specify the paths depicted in Fig. 1 (Sect. 2). The analysis of model fit indicates a satisfactory fit of the model to the data ($\chi^2 = 1160.635$, $p < 0.001$, $df = 677$, $CFI = 0.960$, $RMSEA = 0.025$, $SRMR = 0.061$). Hence, the interpretation of the model results is admissible.

To examine the postulated mediation hypotheses, we also model indirect effects (1) of variables relating to the process of vocational choice before the school-to-work transition (occupational self-efficacy, anticipated fit) and (2) of indicators of

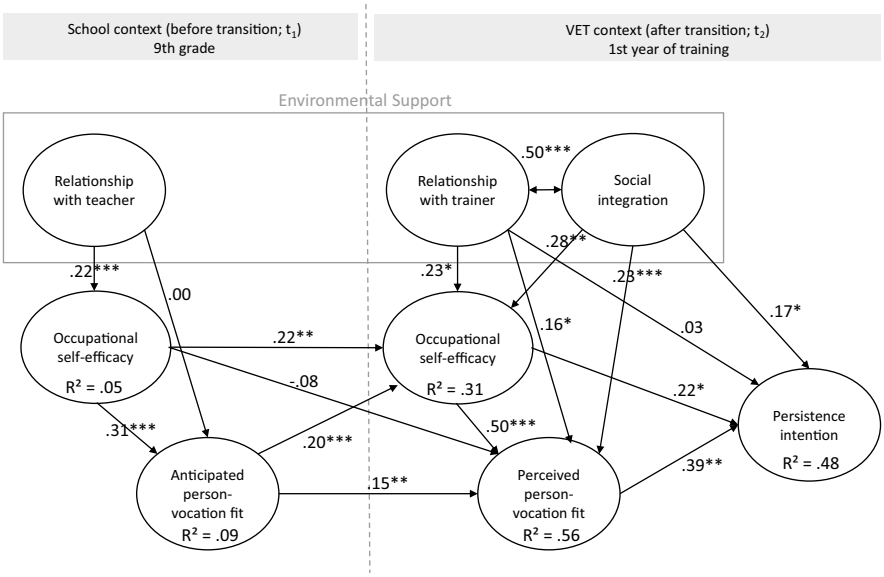

Fig. 2 Path coefficients of the structural equation analysis (N = 1,163). Note. *** $p < .001$, ** $p < .01$, * $p < .05$. Standardized path coefficients. Model fit: $\chi^2 = 1160.635$, $df = 677$, $p < .001$, $CFI = .960$, $RMSEA = .025$, $SRMR = .061$

environmental support (relationship with the teacher, relationship with the trainer, and social integration) on persistence intention. In our analysis, we allow for different indirect paths to examine the relationships between the different constructs of the model in detail.

Results

The results of the structural equation model are shown in Fig. 2. To increase readability, the figure only contains the latent constructs, omitting the display of the measurement models. As the results show, the model can explain 48% of the variance in persistence intention. Persistence intention is significantly and positively predicted by both occupational self-efficacy and perceived person-vocation fit during the VET program. Hence, the relationships hypothesized in H1 (*effects of (a) occupational self-efficacy and (b) perceived person-vocation fit on persistence intention*) are supported by the data.

Regarding environmental support during the VET program, we expected *persistence intention to be both directly and indirectly affected by the relationship with the trainer* (H2) and *social integration* (H3). The results in Fig. 2 show a significant direct effect of social integration on persistence intention. However, there is no direct effect of the relationship with the trainer on trainees' intention to complete the training program. The results of the analysis of indirect effects are displayed in Table 3. The findings support the assumption of indirect effect of both the relationship with

Table 3 Indirect effects on persistence intention (N = 1,163)

Predictor	Mediator(s)	Specific indirect			Total indirect		
		Std. Coef	p	95% CI	Std. Coef	p	95% CI
Anticipated person-vocation fit (t_1)	Perceived person-vocation fit (t_2)	.06	.042	(.011,.105)	.15	.000	(.086,.213)
	Occupational self-efficacy (t_2)	.05	.033	(.012,.094)			
	Perceived person-vocation fit (t_2), Occupational self-efficacy (t_2)	.04	.033	(.009,.067)			
Occupational self-efficacy (t_1)	Anticipated person-vocation fit (t_1), Occupational self-efficacy (t_2)	.02	.040	(.003,.029)	.11	.012	(.037,.179)
	Occupational self-efficacy (t_2), Perceived person-vocation fit (t_2)	.04	.040	(.008,.076)			
	Anticipated person-vocation fit (t_1), Perceived person-vocation fit (t_2)	.02	.049	(.003,.033)			
	Anticipated person-vocation fit (t_1), Occupational self-efficacy (t_2), Perceived person-vocation fit (t_2)	.01	.040	(.002,.021)			
Relationship with the teacher (t_1)	Occupational self-efficacy (t_1), Anticipated person-vocation fit (t_1), Occupational self-efficacy (t_2)	.00	.049	(.001,.007)	.00	.776	(-.020,.004)
	Occupational self-efficacy (t_1), Occupational self-efficacy (t_2), Perceived person-vocation fit (t_2)	.01	.050	(.001,.017)			
	Occupational self-efficacy (t_1), Anticipated person-vocation fit (t_1), Occupational self-efficacy (t_2), Perceived person-vocation fit (t_2)	.00	.052	(.000,005)			
Relationship with the trainer (t_2)	Occupational self-efficacy (t_2)	.06	.053	(.009,.113)	.17	.001	(.080,.250)
Social integration (t_2)	Perceived person-vocation fit (t_2)	.09	.012	(.031,.146)	.21	.000	(.120,.306)
	Occupational self-efficacy (t_2), Perceived person-vocation fit (t_2)	.05	.034	(.012,.092)			

Outcome variable: Persistence intention. Std. Coef. = standardized path coefficient. CI = Confidence interval. Only significant paths are reported

the trainer and social integration on persistence intention. Overall, H2 is only partly supported by the data, as we expected both direct and indirect effects (partial mediation) of the relationship with the trainer on persistence intention. Instead the results point towards a full mediation. In contrast, social integration yields both indirect and direct effects on persistence intention pointing in the same direction (partial mediation). This is in line with our hypothesis (H3).

Regarding the t_1-indicators, we expected *indirect effects of occupational self-efficacy* (H4) as well as *anticipated person-vocation fit* (H5) on persistence intention. We expected the effects to be mediated by the respective indicators at t_2. In order to test these mediation hypotheses, while analyzing indirect effects we additionally modelled direct effects for each t_1-indicator reran the model. The results show that the direct effects of occupational self-efficacy at t_1 ($\beta = -0.09$, $p = 0.093$) and anticipated person-vocation fit ($\beta = -0.04$, $p = 0.531$) on persistence intention are insignificant.

Based on the results in Table 3, we can conclude that there are full mediation effects for the t_1-measures of anticipated person-vocation fit and occupational self-efficacy on persistence intention. Thus, the results (partly) support H4 and H5 (mediation effect for anticipated fit and occupational self-efficacy). In fact, there are several significant paths from both anticipated fit and occupational self-efficacy to persistence intention. While for anticipated fit, there is a significant path via perceived fit, occupational self-efficacy at the end of compulsory school seems to be linked to persistence intention via paths that not only go through occupational self-efficacy during VET (t_2).

In regard to the relationship with the teacher (t_1), the results are unclear. The direct effect of the relationship with the teacher on persistence intention is insignificant ($\beta = -0.05$, $p = 0.430$). There seem to be three possible indirect effects; however, all of them are very small. Also, the total indirect effect is insignificant. Overall, the results point towards no effect, contradicting H6 (*indirect effect of relationship with the teacher on persistence intention*).

Finally, we were interested in the relationship between occupational self-efficacy and person-vocation fit. We formulated two hypotheses (H7: *effect of anticipated person-vocation fit (t_1) on occupational self-efficacy (t_2)*; H8: *effect of occupational self-efficacy (t_1) on perceived person-vocation fit (t_2)*). We modeled cross-lagged effects between the two measurement points. The results in Fig. 2 show a significant positive effect of anticipated person-vocation fit on occupational self-efficacy during VET ($\beta = 0.20$, $p = 0.000$). Contrary to our expectations, however, perceived person-vocation fit during VET was not significantly affected by occupational self-efficacy at the end of compulsory education ($\beta = -0.08$, $p = 0.094$). Hence, H7 is supported by these results, while H8 does not hold. To examine the relationship between these two constructs more thoroughly, we additionally analyzed a model where the path between occupational self-efficacy (t_1) and perceived person-vocation fit (t_2) and the path between perceived person-vocation fit (t_1) and occupational self-efficacy (t_2) were set equal. The Satorra-Bentler scaled χ^2 difference test (*TRd*) revealed a significant decline in model fit for the constrained model (*TRd(1)* $= 12.336$, $p = 0.000$). This supports the finding that the path between occupational self-efficacy (t_1) and

perceived person-vocation fit (t_2) and the path between perceived person-vocation fit (t_1) and occupational self-efficacy (t_2) are, in fact, significantly different.

Discussion

General Discussion

This longitudinal study aimed to explain persistence intention of trainees in Switzerland by (1) indicators of work adjustment during the VET program (t_2), (2) selected indicators of the process of vocational choice (t_1), and (3) environmental support measures before and after the transition to the dual VET program (t_1 and t_2). Since SCCT has rarely been applied to the transition from school to VET, our study provides evidence on the applicability of SCCT to this important transition.

The analyzed model fits the data well and explains 48% of the variance in persistence intention. The results indicate significant effects of (1) *work adjustment indicators* on persistence intention. Both self-efficacy and perceived person-vocation fit during the VET program significantly and positively predict trainees' intention to complete the VET program. While the positive effect of self-efficacy is in line with evidence from the context of higher education (Lent et al., 2013, 2015; Navarro et al., 2019), most studies found only indirect effects of interest congruence on persistence (e.g.Lent et al., 2013, 2016). The medium-sized effect of person-vocation fit in our model points towards a higher importance of fit indicators in the context of VET compared to higher education. This would mean that the relationships in the model are domain-specific. In fact, in a comparison between the academic and work domains, Sheu et al. (2018) show that the strength of several paths in the SCCT model varies by domain. Apart from the domain, part of the effect might also be explained by using a broader construct: person-vocation fit comprehends interest congruence typically analyzed in SCCT models and includes the fit between the vocation and an individual's skills and personality.

As (2) *indicators of the vocational choice process*, we used anticipated person-vocation fit as well as occupational self-efficacy. The results show full mediation effects for both anticipated person-vocation fit and occupational self-efficacy (t_1) on persistence intention. This supports the important role of person-vocation fit in explaining persistence intention in VET. This result is in line with expectations and previous findings (Nägele & Neuenschwander, 2015). More detailed mediation analyses show that the relationship between anticipated person-vocation fit and persistence intention always occurs through perceived person-vocation fit during the VET program. For self-efficacy, however, there are significant paths that do not include self-efficacy during VET but rather person-vocation fit.

Based on previous results (e.g.Lent et al., 2015; Nägele & Neuenschwander, 2015; Navarro et al., 2014), we expected a certain stability of both self-efficacy and person-vocation fit before and after the transition to VET. This assumption is supported by the data, although the relationships are rather small for both constructs. However, small effect sizes are not very surprising as trainees' responses at the end

of compulsory education (t_1) refer to the anticipated situation in their future training program. The positive relationship shows that adolescents have a somewhat realistic idea about the situation they will encounter in their VET program.

Regarding (3) *environmental support*, we expected both direct and indirect effects of environmental support measures during the VET program (relationship with the trainer and social integration) on persistence intention. The results show that this hypothesis holds only for social integration, while the effect of the relationship with the trainer on persistence intention is mediated by occupational self-efficacy. Hence, the relationship with colleagues seems to be more important than the relationship with the trainer in regard to dropout decisions. The influence of a trainer on premature contract terminations seems to be limited.

Moreover, the relationship with the teacher during compulsory education (as indicator of *environmental support* before the transition) does not significantly affect persistence intention. Based on prior empirical findings (e.g.Ali & McWhirter, 2006; Lent et al., 2013, 2015; Metheny et al., 2008), we expected to find an indirect relationship. The data did not support this. The relationship with the teacher does, however, significantly affect occupational self-efficacy during 9th grade.

Finally, our analysis provides evidence on the relationship between self-efficacy and interest congruence that has not been clarified thus far (chicken-and-egg discussion; see Sect. 2.4). Our results point towards a causal trend from anticipated person-vocation fit to occupational self-efficacy over time but not vice versa. This finding is interesting, as it contradicts both relationships that have been postulated thus far. SCCT suggests that self-efficacy predicts interest congruence but claims that reciprocal relations also seem plausible (Lent et al., 1994). Evidence from studies in the context of higher education supports both a unidirectional effect from self-efficacy on interest congruence (Lent et al., 2008, 2015; Navarro et al., 2014) and reciprocal paths (Lent et al., 2010; Nauta et al., 2002). Again, the contradicting result might be explained by the different contexts or the broader concept of fit applied in our study.

Limitations

The results reported above have to be interpreted with respect to several limitations. One limitation of our design is that adolescents were not surveyed during the whole course of their apprenticeship; we can only draw on data from one measurement point at the end of the first year of training. Since transitions have been shown to be most critical at the beginning (Stalder, 2012) and the vast majority of premature contract terminations occur during the first year of training (Frey et al., 2014), the early stage of a training program is the most crucial period. However, it would have been interesting to follow trainees more closely during this period by including several measurement points or to examine them again at a later stage of their VET program. Thus, we might have missed trainees dropping out at the beginning of the training program.

Furthermore, we rely on *intentions* to terminate the training program prematurely. Although there is evidence on a link between dropout intention and actual dropout in the context of higher education programs (Deuer & Wild, 2018; Lent et al., 2016),

the relationship is most certainly not linear. Hence, it would still be interesting to know whether persistence intention actually led to persistence in our sample. This is especially of interest as most adolescents reported rather high persistence intentions ($M = 5.45$, $SD = 0.71$; see Sect. 4.2). Moreover, we have no information about the trainees' paths after terminating the training contract or about reasons for premature contract termination (intentions). Such information would be necessary to examine contract terminations more thoroughly.

Moreover, we only included selected measures with regard to factors influencing dropout decisions in VET programs. Other determinants that have been shown to be related to premature contract terminations (e.g., trainees' skills, quality of the training program) have not been part of our analysis. Although the explained variance of persistence intention in our model is quite high ($R^2 = 0.48$), there are still other relevant factors that we do not address in our approach.

Implications

Implications for Future Research

Our results suggest that some paths postulated in SCCT models are different in the context of VET than in higher education (e.g., the direct effect of person-vocation fit on persistence intention). This might be explained by either the level of education (intermediately qualified adolescents typically choose VET programs) or by differences in the learning context (university program vs. part-time training program). In any case, the model, at least partly, seems to be domain-specific, and further research is necessary to systematically examine differences between domains. In this context it would also be of interest to assess whether the model is applicable for different groups of trainees (gender, professional fields etc.).

The findings also provide new insights in the chicken-and-egg discussion regarding the relationship between self-efficacy and interest congruence. The positive effect of person-vocation fit on self-efficacy identified in our model is not in line with SCCT and existing evidence from the field of higher education. Future studies should address this relationship further. Domain-specific analyses seem to be called for as well.

Practical Implications

As our results show, perceived person-vocation fit is the largest predictor of the persistence intention of trainees in VET programs. As the process of vocational choice predetermines person-vocation fit, adolescents' efforts in this regard seem to be crucial to avoid premature contract termination. It is plausible to assume that specific support (e.g., parents, peers, career counseling) during this process is beneficial, although the relationship with the teacher did not prove to be a significant predictor in our analysis.

During the VET program, social integration proved to be a significant predictor of persistence intention, while the relationship with the trainer only affected trainees' self-efficacy. Hence, training companies should pay specific attention to the early integration of trainees in their teams.

Consequently, support measures for adolescents both prior to the transition (supporting the choice of suitable vocations) as well as after the transition (supporting social integration in the workplace) are promising approaches to try and reduce the high numbers of premature contract terminations in VET programs.

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Data Availability The data is available via FORSbase: https://forsbase.unil.ch/project/study-public-list/?csrfmiddlewaretoken=qJxueAdA2SAI3RJ3b2Ph54GCQlwF3FvWQBqgf61pMtKlvCVPZVNBCWNv9URCvsK6&q=wisel&ds_topic_id=-1&language_id=-1&discipline_id=-1&method_instrument_id=-1&financing_id=-1&study_type_id=-1&from_date=&to_date=&search=Suchen&show_hide=0

Code Availability Code is provided by the first author upon request.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

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