

Long-term effects of different VET-to-labor market transition patterns on subjective well-being

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Abstract Several studies have analyzed the outcome of vocational education and training (VET); however, they primarily compared individuals with different qualification levels. This perspective neglects the fact that adolescents can differ in their training courses and transition to the labor market. Thus far, evidence on the consequences of different VET-to-labor market transition patterns is scarce. Therefore, the present study distinguished different VET-to-labor market transition patterns of German trainees and analyzed the long-term consequences on subjective well-being (SWB) later in life. Our results show in-between differences in the SWB of trainees in further life by different VET-to-labor market transition patterns. Compared to individuals with direct VET-to-labor market transitions, individuals who experienced a premature training termination and did not return to institutionalized education were more likely to have lower SWB later in life. Additionally, participating in general or higher education programs after VET seems to be beneficial. However, completing multiple VET programs did not influence SWB. The results underline the importance of strategies to prevent early leaving from education and training.

Keywords Vocational education and training · Outcome · Subjective well-being · Sequence and cluster analysis · Life course development

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Langfristige Effekte unterschiedlicher Muster des Übergangs von der Ausbildung in den Arbeitsmarkt auf das subjektive Wohlbefinden

Zusammenfassung In bisherigen Studien zu Outcome von Ausbildung erfolgte meistens nur ein Vergleich von unterschiedlichen Qualifikationsniveaus. Diese Perspektive vernachlässigt jedoch, dass sich Jugendliche in ihrem Ausbildungsverlauf und beim Übergang in den Arbeitsmarkt unterscheiden können. Bisher bestehen nur wenige Erkenntnisse über die Folgen unterschiedlicher (Aus-)Bildungswege von Ausbildung in den Arbeitsmarkt. Die vorliegende Studie analysiert daher (Aus-)Bildungswege von Auszubildenden in den Arbeitsmarkt und deren Einfluss auf das subjektive Wohlbefinden (SWB) im späteren Leben. Die Ergebnisse zeigen deutliche Unterschiede im SWB, wenn diese nach Übergangsmustern differenziert werden. Im Vergleich zu Personen mit direktem Übergang in den Arbeitsmarkt weisen Personen mit Abbruch eines Ausbildungsverhältnisses ohne Teilnahme an weiterer institutionalisierter Bildung signifikante Nachteile im SWB auf. Teilnahme an allgemeiner Bildung und Hochschulbildung nach der Ausbildung scheint zudem vorteilhaft für das SWB zu sein. Mehrere erfolgreiche Ausbildungsabschlüsse hatten jedoch keinen Einfluss auf das SWB. Die Ergebnisse unterstreichen die Bedeutung präventiv Ausbildungs- und Bildungsabbrüchen entgegenzuwirken sowie in der Berufsbildungsforschung verschiedene Verlaufsmuster bzw. auch verschiedene Formen von Ausbildungsabbrüchen stärker zu berücksichtigen.

Schlüsselwörter Ausbildung · Wirkung und Erträge · Subjektives Wohlbefinden · Sequenz- und Clusteranalyse · Entwicklung des Lebensverlaufs

1 Introduction

Transitions from school to the labor market represent an important stage in the life course of adolescents. In several countries (e.g., in Germany, Austria, Switzerland), in addition to higher education, vocational education and training (VET) systems pave the way for acquiring qualifications for the labor market. Here, the acquisition of a vocational qualification certificate is important for initiating a career. The main objectives of VET are to (1) foster skills for “individual vocational adjustment”—that is, shape “educational pathways and life in society in a responsible and self-directed way”; (2) protect human resources aimed at acquiring relevant labor market skills; (3) guarantee social share and equal opportunities to minimize “dependencies between the social background and educational-, life-, and income opportunities to enhance social integration and participation of young people in process of shaping their social and political community” (Baethge et al. 2006, p. 11 f.). Therefore, for individuals, outcomes of VET refer not only to the labor market and monetary aspects but also to non-monetary aspects (Autorengruppe Bildungsberichterstattung 2018).

However, most studies on the effect of VET programs focus primarily on a comparison among qualification levels (e.g., CEDEFOP 2013b; Friedrich and Hirtz 2021; Neugebauer and Weiss 2018). Empirical findings demonstrate, for exam-

ple, economic (e.g., higher wages) and employment advantages as well as a better health status for VET graduates compared to unskilled or lowly qualified individuals in the long term (CEDEFOP 2013a; Hoeckel 2008). However, a comparison between VET graduates and unskilled individuals does overlook the fact that adolescents can differ in their training course, and thus, in the process of acquiring a qualification as well as in their VET-to-labor market trajectories. A more detailed distinction is necessary to account for the diverse transition patterns into the labor market that have been revealed in prior studies (transition from school to labor market: e.g., Achatz et al. 2022; Baas and Philipps 2017; Brzinsky-Fay 2007; Michaelis et al. 2022; Stuth and Jahn 2020; transition from VET to labor market: Brzinsky-Fay et al. 2016; Kotte 2018; Konietzka 2002; Menze 2017; Michaelis and Richter 2022). These transition patterns include—but are not limited to—failures in VET programs, as premature training terminations (PTTs) are fairly common in VET programs (Autor:innengruppe Bildungsberichterstattung 2022; Michaelis and Richter 2022; Rohrbach-Schmidt and Uhly 2015; Schmid and Stalder 2012; Wydra-Somaggio 2021). PTTs can result in individuals entering the labor market with no or low qualifications. However, transition patterns also include non-linear pathways into the labor market that occur due to participation in multiple VET programs and/or subsequent higher qualifications (in the sector of further training and higher education).

There is an increasing number of studies on PTT in VET (Böhn and Deutscher 2022), and certain studies also provide results related to the effects of PTTs. For example, evidence reveals that a wage penalty and shorter employment periods can be observed 10 to 15 years after the first apprenticeship for people with a PTT compared to successful trainees (Patzina and Wydra-Somaggio 2020, 2021). Furthermore, a PTT not only extends the transition into the labor market but can also include experiences of failure. For example, Schmid (2010) revealed that people differ in terms of affective dispositions (life attitudes, self-esteem, and absence of depression) three years after a PTT. However, it is important to examine the long-term effects of PTTs in a more differentiated manner, because several studies indicate that a PTT does not necessarily mean that individuals drop out of education and training (Kotte 2018; Michaelis and Richter 2022; Wydra-Somaggio 2021). Trainees may continue their training in another company or occupation or participate in other educational programs (Krötzig and Deutscher 2022; Michaelis and Richter 2022). Hence, both within PTTs and apart from PTTs, a distinct examination of different VET-to-labor market transition patterns is needed, particularly with respect to long-term effects, which have generally not been sufficiently explored. Moreover, apart from VET outcomes with respect to employment situation and earnings, it appears warranted to examine the effects of PTT on individuals' subjective well-being (SWB), since it is plausible to expect that differences in trajectories affect long-term SWB. For example, reintegration into VET can be expected to have a preventive effect against the deterioration of individuals' SWB (e.g., Schmid 2010).

Against this background, the present study focuses on the effects of different VET-to-labor market transition patterns on individuals SWB in later life. Linking different VET-to-labor market transitions and long-term effects meets two major desiderata of research in VET: On the one hand, this research perspective accounts

for the heterogeneous patterns of educational trajectories and enables a more distinct interpretation than comparing the maximum qualification level achieved. Second, the results are important for the interpretation of consequences of different types of PTTs in the long-term and with respect to outcomes that go beyond individuals' employment situations; here, we specifically focus on individuals' SWB. Using a sample of German trainees, we (1) identify different types of VET-to-labor market transition patterns that also take into account discontinuity and failure in VET programs as well as multiple qualification trajectories. Based on the identified trajectories, we (2) examine the influence of different VET-to-labor market transition patterns on SWB later in life.

2 The German VET system and VET-to-labor market trajectories in Germany

In Germany, the VET system is highly important for securing the demand for a skilled labor force. It is one of two options for high school graduates: in 2020, 624,299 adolescents started a training program in the VET sector, compared to 494,094 adolescents who started a higher education program (Autor:innengruppe Bildungsberichterstattung 2022). The German VET system comprises two sectors: the dual system (432,262 beginning trainees in 2020, Autor:innengruppe Bildungsberichterstattung 2022) and the school-based VET system (202,038 beginning trainees in 2020, Autor:innengruppe Bildungsberichterstattung 2022). Both systems differ primarily in occupational structure. Whereas the dual system focuses on the skilled labor needs of the economy, the school-based VET system mainly comprises training programs for occupations in the health, social work, and education sectors (Michaelis 2017). VET qualifications are assigned to levels 3 and 4 of the German Qualification Framework (Germany's adaptation of the European Qualification Framework), which is below the qualifications in the higher education sector (starting at level 6). Programs in the VET system are particularly interesting for low- and intermediate-educated adolescents, as no university entrance qualification is expected. Programs in the dual system are even formally free of entry requirements. However, adolescents usually have to compete in a company-based selection process to obtain a training position in the dual system. Further, some options in the school-based VET system are restricted, with access requiring an intermediate educational qualification (Michaelis 2017).

After completing VET in Germany, individuals encounter good employment opportunities. This is illustrated by low youth unemployment rates in Germany (Seeber et al. 2019) and high shares of direct employment after the completion of VET (Autorengruppe Bildungsberichterstattung 2018; Brzinsky-Fay et al. 2016). Moreover, empirical analyses show that individuals with qualifications in the VET system are less likely to be unemployed and earn higher wages compared to unqualified individuals (Autorengruppe Bildungsberichterstattung 2018; Ebner 2015). However, not all adolescents show direct transitions from VET to employment. On the one hand, further qualifications can be acquired in the VET system, particularly for revising career decisions (Hillmert and Jacob 2003). Further, adolescents can achieve a qual-

ification in higher education before starting with employment (Baas and Philips 2017) to increase their labor market opportunities as well as later returns to education (Ebner 2015). On the other hand, many adolescents in the German VET system experience a PTT (Autor:innengruppe Bildungsberichterstattung 2022; BIBB 2020; Michaelis and Richter 2022). If adolescents terminate a VET program prematurely, this does not necessarily mean an early drop out of education and training.

Studies show that a large proportion of adolescents with PTT succeed in returning to VET (Kotte 2018; Michaelis and Richter 2022; Wydra-Somaggo 2021) or other educational programs. These types of PTTs can be described as *horizontal dropout* or *upward dropout* (Krötz and Deutscher 2022). However, opportunities after a PTT may be limited at first, as many educational programs have fixed starting dates, usually in the summer/fall. Therefore, short-term episodes of unemployment might be experienced before continuing the educational trajectory. Further, some adolescents do not return to institutionalized education; thus, PTT can also initiate an early drop out of education and training (Michaelis and Richter 2022), so-called *downward dropout* (Krötz and Deutscher 2022).

3 Relating subjective well-being to the outcomes of educational processes

3.1 Conceptualization of subjective well-being

SWB is directly related to perceptions of quality of life and refers to whether an individual “subjectively believes his or her life is desirable, pleasant, and good.” (Diener 2009, p. 1). Since each individual evaluates their circumstances based on their previous experiences, their unique values, and their own expectations, reactions to certain circumstances can differ between different people. Hence, “the subjective element is essential” in the assessment of quality of life (Diener et al. 1999, p. 277).

Diener et al. (1999) claimed that instead of assessing global happiness, different aspects of SWB should be assessed separately. This can also be applied to the assessment of different domain satisfactions. Campbell et al. (1976) support the approach of a separate assessment of different domains for two reasons: (1) it might be difficult for individuals to provide a global overall assessment of their life as a whole, and (2) a detailed assessment provides more information, as one can assume that a general dissatisfaction with one’s life situation is due to a particularly high dissatisfaction in certain domains (e.g., job, marriage). In their study on “the quality of American life”, Campbell et al. (1976, p. 63) assessed participants’ satisfaction with the following domains: *marriage, family life, health, neighborhood, friendships, housework, job, life in the United States, city, or county, nonwork, housing, usefulness of education, standard of living, amount of education, and savings*.

Since the body of literature on SWB is large and the number of domains that could potentially be examined with regard to SWB covers all fields of an individual’s life, it is necessary to focus on selected aspects of SWB. This study focuses on educational outcomes; thus, it seems worthwhile to identify aspects of SWB related to education. In general, from an individual’s perspective, educational processes—if

successful—foster individual competencies and lead to the acquisition of formal qualifications. As such, they lay the foundation for following educational processes as well as for the entire course of life. In terms of the effects of education, Autorengruppe Bildungsberichterstattung (2018) differentiated between three different areas that are affected by education: (1) labor market outcomes (e.g., employment), (2) monetary outcomes (e.g., individuals' income), and (3) non-monetary outcomes (e.g., health). Consequently, it seems appropriate to consider the SWB domains in the assessment of the effects of educational trajectories on SWB.

3.2 Empirical evidence on the effect of education on subjective well-being

It is generally assumed that education increases individuals' SWB and that SWB can be regarded as a non-monetary outcome of education (e.g., Vila 2000). Education is believed to lead to higher material and non-material living conditions, which increase individuals' opportunities to satisfy human needs (Vila 2000). Hence, the human capital resulting from education is postulated to have a higher effect on people's lives than to increase their economic productivity (Becker 1993). However, empirical evidence on the relationship between education and SWB is not as clear (e.g., Diener et al. 1999). Nevertheless, the majority of studies indicate that although the effect is not very strong, education is still a positive predictor of SWB. In their meta-analysis, Witter et al. (1984) showed that education (operationalized as number of years of schooling as well as degrees and qualification level attained) accounts for 1 to 3% of the variance in the SWB of adults. The authors found stronger relationships for women than for men and for older adults compared to younger adults. Similar effect sizes have been found in more recent studies (e.g., Blanchflower and Oswald 2004; Salinas-Jiménez et al. 2013). Other studies have also shown that a higher number of years of education positively affects life satisfaction (Clark et al. 2001; Diener et al. 1999).

Further, later in life, dynamic complementarities between education, work, and family are observable (Autorengruppe Bildungsberichterstattung 2018). This means that the effects of education on SWB are reduced when other variables influenced by education are controlled for in the context of explaining SWB. For example, empirical findings suggest that the effect of education on SWB is (partially) mediated by income and occupational status (Campbell et al. 1976; Diener et al. 1993; Witter et al. 1984). There are studies showing that the effect of education on SWB becomes insignificant once income is controlled for (e.g., Argyle 1999). However, in the majority of studies, education remains a significant predictor of SWB, independent of income (e.g., Blanchflower and Oswald 2004; Möwisch et al. 2021; Sandvik et al. 1993; Salinas-Jiménez et al. 2013). The positive relationship between education and SWB seems to hold equally for different domain satisfactions. In a recent study using Dutch panel data, Ilies et al. (2019) examined the effect of education on job satisfaction, financial satisfaction, and health satisfaction. The authors showed that each of the three domain satisfactions examined independently and significantly positively predicted individuals' overall life satisfaction. The results also showed that education (indirectly) affects financial satisfaction, job satisfaction, and health satisfaction.

Empirical evidence on the role of vocational education in SWB remains scarce. However, Jongbloed (2018) recently compared the effects of vocational education and higher education. The study included more than 50,000 individuals from 27 European countries and examined the effects of vocational education and higher education on individuals' life satisfaction as well as their 'flourishing' (referring to "the achievement of high levels of well-being and typically includes both hedonic and eudaimonic components"; Jongbloed 2018, p. 735). Compared to low qualification levels, there is a positive effect of vocational education on flourishing; however, there is no significant effect of vocational education on life satisfaction. Higher education, in turn, affects both life satisfaction and flourishing. Based on the results of her study, Jongbloed (2018, p. 746) argues that the conceptualization of SWB and the choice of measurement instruments are crucial in detecting the relationships between education and SWB, and that existing studies "may have underestimated the positive effects of post-secondary education on well-being".

Apart from the general effect of education on SWB, it seems plausible to expect the negative effects of educational discontinuities or negative educational experiences on SWB. This is particularly relevant for VET programs, where PTTs and related discontinuities in the transition to the labor market are rather common (see Sect. 2) and affect individuals at a relatively young age. There are only a few studies relating SWB to educational discontinuity. Further, these studies typically refer only to unemployment as one form of discontinuity. For instance, for German panel data on the male workforce ($N=4183$), Winkelmann and Winkelmann (1998) showed that unemployment had a significant negative effect on life satisfaction and that the associated loss of income accounted for only a small portion of the decrease in satisfaction, whereas the non-pecuniary effect was much higher. Similar results were found by Gerlach and Stephan (1996). Further, findings from another German panel data ($N=25,019$) show that the negative effect of unemployment did not only affect currently unemployed individuals. Instead, individuals with higher levels of past unemployment also reported significantly lower life satisfaction. This effect was stronger for males than for females (Clark et al. 2001). Dietrich et al. (2022) analyzed the SWB of Australian adolescents during the school-to-work transition and showed that dropping out of high school negatively affected adolescents' SWB. There was also a negative effect of transitions into unemployment on SWB. Overall, the results lend support to the assumption that discontinuous educational trajectories are related to lower levels of SWB. However, the long-term effects were not investigated in this study.

Besides education, several other factors have been shown to be related to SWB and should therefore be considered and controlled for in the empirical analysis (see also Sect. 5.4). An important factor to consider is individuals' personalities, which studies on SWB have identified as one of the strongest and most consistent predictors (Diener and Lucas 1999). Studies on SWB typically also examine the roles of different demographic factors (especially age, sex, and migration background). However, demographic variables have been shown to have only little explanatory power, which might be explained by the mediating role of psychological processes (e.g., coping abilities) (Diener et al. 1999). Lastly, studies on SWB should take into

account people's current living situations (e.g., marital status; Clark et al. 2001; Diener et al. 1999).

4 The present study and hypotheses

This paper aims to examine the influence of different VET-to-labor market transition patterns on SWB later in life and contributes to the existing literature in the following ways. Although several studies are currently examining PTT in VET, there is still a lack of evidence on the (long-term) effects of different types of PTT or different VET-to-work transition patterns. Consequently, on the one hand, this study is of general interest to the field of vocational education. On the other hand, as there seem to be different effects of vocational education and higher education on SWB (Jongbloed 2018), and the vocational education system is still underrepresented regarding the role of education on SWB, our study also adds to existing research on SWB by including and examining vocational education as an important form of education. In line with Autorengruppe Bildungsberichterstattung (2018), we differentiate between three different aspects of SWB to address the multidimensionality of returns to VET: *satisfaction with work (SW)*, *satisfaction with standard of living (SSL)*, and *satisfaction with health (SH)*. Consequently, we focus on the following research questions:

1. What types of VET-to-labor market transition patterns can be identified?

Based on the evidence from the VET sector reported above, we expect to find both direct (employment after a completed VET program) and indirect trajectories into the labor market. Here, the latter could potentially include different paths, for example, via further general or higher education as well as different types of PTTs.

2. What influence do different VET-to-labor market transition patterns have on (a) SW, (b) SSL, and (c) SH in later life?

We generally expect different types of VET-to-labor market transitions to be related to differences in individuals' SWB later in life. This appears plausible because studies have identified different effects of different educational paths on SWB (Jongbloed 2018). Further, findings reveal a long-term effect of discontinuous educational trajectories (e.g., dropouts, unemployment) on SWB later in life (Clark et al. 2001; Dietrich et al. 2022). Based on the evidence reported above, we particularly expect transition patterns that include PTTs—and could, therefore, be characterized as discontinuous—to have a negative effect on individuals' SWB (H1). Moreover, based on the general positive affect of additional years of education (e.g., Clark et al. 2001; Diener et al. 1999), we hypothesize that transition patterns that include participation in education outside of VET (further education, higher education) will lead to higher values in SWB (H2). In addition, we expect no differences in SWB between transition patterns that include horizontal changes compared to direct transitions. In these cases, PTTs occur as a means to adjust career choices and are, therefore, ex-

pected to increase individuals' SWB. Since extant studies found effects of education on different domains of SWB (e.g., Ilies et al. 2019) and studies on PTTs in VET emphasized that these can affect both working situation and health (e.g., Patzina and Wydra-Somaggio 2020, 2021; Schmid 2010), we do not expect different effects for the different SWB domains examined in our study.

H1 VET-to-labor market transition patterns that include PTT lead to lower SWB.

H2 VET-to-labor market transition patterns that include additional education outside of VET lead to higher values in SWB.

H3 VET-to-labor market transition patterns that include multiple successfully completed VET programs do not lead to lower SWB compared to direct transitions.

Moreover, we expect the effect of transition patterns on SWB to decline once income (e.g., Blanchflower and Oswald 2004; Möwisch et al. 2021; Sandvik et al. 1993; Salinas-Jiménez et al. 2013) and current employment status (e.g., Gerlach and Stephan 1996; Winkelmann and Winkelmann 1998) are controlled for (H4).

H4 Controlling for income situation and current employment decreases the effects of VET-to-labor market transition patterns on SWB.

5 Design and methodology

5.1 Data

We used the start cohort 6 of the National Educational Panel Study (NEPS) (Blossfeld and Roßbach 2019; NEPS Network 2021). This is a survey with individual information on the life course development of Germans by detailed monthly observations (birth cohorts: 1944–1986). The survey was developed in 2007. The sample was refreshed in waves 2 (2009/2010) and 4 (2011/2012). In the first interview, adults were retrospectively asked about their educational and employment biographies as well as their current state of SWB. Thereafter, adults were re-interviewed with regard to their current developments and SWB (up to 2020). The different waves and the measurement points of the constructs used are depicted in Fig. 1.

We reduced the data set to individuals who started their first VET program between the ages of 14 and 25, the essential stage of life in the transition from school to work. Additionally, we excluded individuals who started their first training program in the former German Democratic Republic (until 1990) due to structural differences between the VET systems in both German states. To identify discontinuities in the VET-to-work transition, we set the follow-up period to 7 years (84 months) after starting the first VET program. However, for a sequence and cluster analysis,

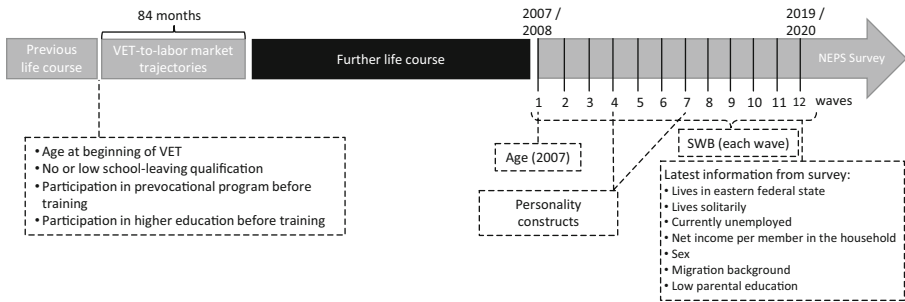


Fig. 1 Overview of measurement waves and instruments

it is necessary to ensure an equal length of sequences as well as a low number of missing values in the status information per month. Therefore, we considered only individuals with at least a follow-up period of 84 months. Additionally, we followed methodological recommendations to exclude individuals with more than 30% missing data in the observable months (>25 months, Dlouhy and Biemann 2015), leaving 10,048 individuals for the analysis.

5.2 Dependent variables

We used three dependent variables to measure SWB. These variables are *satisfaction with work (SW)* (“How satisfied are you with your work?”), *satisfaction with standard of living (SSL)* (“How satisfied are you with what you have? Please consider money, income, and things that you own”), and *satisfaction with health (SH)* (“How satisfied are you with your health?”). All items of SWB were measured on an 11-point Likert scale (0: “completely dissatisfied” to 10: “completely satisfied”). Due to the survey design, SWB items were regularly re-asked. We used the mean of all observed answers per item since the first survey wave and, thus, compensated for outliers between the waves. As there were cases with missing values in the dependent variables for all measurement points, the sample had to be reduced to 9172 individuals for analyzing SW and to 10,046 individuals for analyzing SSL. The reduction of the sample for analyzing SW was related to the survey design, because individuals who were not employed at the time of their interview could not have answered the related question. It must be mentioned here that the measurement of SWB involves self-evaluation and, as such, comes with limitations. As Diener et al. (1999, p. 290) recommended, measurement of SWB should ideally be supplemented with other indices of well-being, such as biological indexes, facial expressions, experience sampling, and cognitive measures. However, this was not possible in this study.

All dependent variables were negatively skewed (right-censored data: SW: $M=7.294$, $SD=1.694$; SSL: $M=7.605$, $SD=1.504$; SH: $M=7.255$, $SD=1.786$), which indicates that most people experienced high levels of SWB.¹ Therefore, we clustered

¹ High values in SWB in Germany are well documented (Helliwell et al. 2022) as Germany is a high industrialized country with great prosperity.

the sample into two groups by the median for each SWB construct (SW = 7.500; SSL = 7.909; SH = 7.545). Thus, our dependent variables measured whether an individual's SW, SSL, and SH were high ($>$ median, = 1) or low/moderate (\leq median, = 0).

5.3 Independent variables

To cluster the heterogeneous VET-to-labor market transition patterns, we used a sequence and cluster analysis, an explorative method that investigates heterogeneous life course developments (Brzinsky-Fay et al. 2006). Therefore, we identified the status of NEPS participants for each month after the beginning of the first VET program by an observation time of 7 years (84 months). We selected this observation period to be able to observe combinations of different educational options (in Germany, the average duration of a VET program is three years). We distinguished whether a person participated in VET, prevocational programs, general education, higher education, unemployment, employment, further education, other (e.g., military service), or categorized as 'unknown' for a missing value in the monthly status. To visualize discontinuities in VET trajectories, we also differentiated the number of VET programs as well as whether a VET program was successfully completed.²

In certain cases, we found parallel status information for a specific month. We resolved these monthly duplicates by prioritizing the status information by the following ranking: (1) VET, (2) prevocational program, (3) general education, (4) higher education, (5) unemployment, (6) employment, (7) further education, (8) other, and (9) unknown. We then used the SQ-Ados tool in Stata (Brzinsky-Fay et al. 2006) to identify different VET-to-labor market transition patterns. This tool utilizes an optimal matching algorithm that aims to minimize within-group differences and maximize between-group differences (Stuth and Jahn 2020). Therefore, the program grouped the sequences according to similarities in the order of the status per month and changes in the status in each sequence (Brzinsky-Fay et al. 2006; Stuth and Jahn 2020). However, sequence and cluster analysis is an explorative method that can generate multiple solutions. The selection of the most suitable number of clusters should also be based on content-related considerations, particularly if a many status forms are distinguished (Michaelis et al. 2022). Therefore, in the first step, we evaluated different cluster solutions (from 8 to 15 clusters) using the SQ-Ados tool (Brzinsky-Fay et al. 2006) and compared them with institutional structures of school-to-work transitions and important research findings in this field (e.g., Autor:innengruppe Bildungsberichterstattung 2022; Baas and Philips 2017; Brzinsky-Fay 2007; Brzinsky-Fay et al. 2016; Kotte 2018; Krötz and Deutscher 2022; Michaelis et al. 2022; Michaelis and Richter 2022). We found that cluster sizes smaller than 11 clusters could not adequately differentiate trajectories with a PTT (Krötz and Deutscher 2022; Michaelis and Richter 2022). However, the 11-cluster solution differentiated 3 clusters with direct VET-to-labor market transitions that differed only by the training duration. Such a detailed differentiation of direct VET-to-

² Cases with up to four PTTs or three completed training episodes were identified during the observation period.

labor market transitions did not appear suitable for our analyses because there could be diverse reasons for different training durations (formal regulations, recognitions procedures, individual shortening). Consequently, we decided to group direct VET-to-labor market transition patterns into one cluster and generated an eight-cluster solution.

5.4 Control variables

The selection of control variables is mainly based on approaches and evidence from prior studies on SWB, as described in Sect. 3.2. First, we controlled for personal characteristics. Studies on SWB typically examine effects of individuals' age, sex, and migration background and evidence also points toward different relationships between education and SWB based on sex and age (e.g., Witter et al. 1984). Consequently, we integrated a variable that measured the age at the time of the first wave (2007) to control for age effects on SWB; we checked whether a person was female (= 1); and considered a migration background in the regression models if the trainee or at least one parent was born abroad (= 1). We also controlled for personality constructs, which have been shown to be amongst the strongest and most consistent predictors of SWB (Diener and Lucas 1999). Here, we used the Big Five traits—extraversion, agreeableness, conscientiousness, neuroticism, and openness—measured by the Big Five Inventory (BFI-10, Rammstedt and John 2007; NEPS expanded agreeableness by a third variable). The Big Five traits were measured prospectively and were, thus, parallel to the SWB measurements. We used the mean of all Big Five measurements in z-standardized form ($M=0$, $SD=1$).

Second, we controlled for educational biography and discontinuities before beginning the first VET program. Here, we considered whether a person was lowly qualified (“no or regular lower-secondary school certificate”: in German, “kein Abschluss oder Hauptschulabschluss”; 1 = yes). We checked for discontinuities in the school-to-VET transition—that is, participating in prevocational programs (1 = yes) or in higher education (1 = yes). Both aspects are important to control for, since discontinuous educational trajectories are expected to negatively affect SWB (e.g., Dietrich et al. 2022), whereas a higher number of years of education positively affects SWB (e.g., Clark et al. 2001; Diener et al. 1999). In addition, we controlled for age (in years) at the time of participating in the first VET program, since a higher starting age could indicate further discontinuities during general education. Furthermore, we considered low parental education in terms of socioeconomic background. Here, following previous studies of school-to-work transition analyses (Autor:innengruppe Bildungsberichterstattung 2022; Autorengruppe Bildungsberichterstattung 2020; Busse 2020), we distinguished whether both parents had at least an intermediate school-leaving qualification without a vocational degree (1 = yes).

Lastly, studies on SWB strongly suggest the inclusion of indicators of individuals' current living situation (e.g., Clark et al. 2001; Diener et al. 1999) and—when examining the effect of education—income and occupational status (e.g., Witter et al. 1984; Campbell et al. 1976; Diener et al. 1993). Hence, we controlled for several variables of participants' current situation that can influence SWB. One

Table 1 Distribution of control variables

General characteristics (in %)	
No or low school-leaving qualification	38.6
Participation in prevocational program before VET	7.0
Participation in higher education before VET	2.4
Currently unemployed	4.1
Sex (female)	50.2
Migration background	17.3
Low parental education	13.7
Lives in eastern federal state	8.3
Lives solitarily	17.6
Net income	
Net income per member in the household (in hundred €)	15.2
Age information (M/SD)	
Age (2007)	44.0/11.1
Age at beginning of VET	16.9/2.2
Personality constructs (M/SD)	
Extraversion (z-stand.)	0.0/1.0
Agreeableness (z-stand.)	0.0/1.0
Conscientiousness (z-stand.)	0.0/1.0
Neuroticism (z-stand.)	0.0/1.0
Openness (z-stand.)	0.0/1.0
Data not imputed	

variable examined whether the person currently lived solitarily (1 = yes). Moreover, we built a variable that measured the net income per member in the household (in hundred euros). We also controlled for current employment status. Here, we checked whether the person was unemployed—that is, registered at the Federal Employment Agency in Germany (0 = no; 1 = yes). We also controlled for whether the person currently lived in an eastern (= 1) or western (= 0) federal state in Germany, due to lower SWB in eastern federal states in Germany (Hogwood 2011).

Table 1 and Online Resource 1 present descriptive information for the variables used in the analysis.

5.5 Analysis strategy

To determine the influence of different VET-to-labor market transition patterns on the SWB variables, binomial logistic regressions were used. For each SWB construct, we calculated five regression models. M0a indicated the influence of all control variables on the SWB constructs. In M0b, we analyzed the influence of specific VET-to-labor market transition patterns on the SWB constructs without any control variables. Additional models differed in terms of the number of control variables that were regressed. M1 controlled for age, sex, migration background, age at the beginning of VET, low parental education, living in the eastern federal state, living solitarily, and Big Five traits. In M2 and M3, we included important

control variables that are theoretically expected to decrease the influence of VET-to-labor market transition patterns on SWB (educational biography and discontinuities before beginning the first VET program). M3 also covered the variables of current employment and income. The regression models were calculated using Stata 16. We used multiple imputation using chained equations to estimate missing values in the control variables. We followed the official NEPS recommendations for the imputation model. First, we included “all variables in the analytical model to preserve the relationships between variables of interest” (Hondralis and Himbert 2018, p. 6). Additionally, we adjusted the number of imputations to the variable with the largest proportion of missing values and rounded this value to the next decile (Hondralis and Himbert 2018). For our analysis, openness had the largest proportion of missing values (29.8%). Therefore, we used 30 imputations. The effects in the regression models are shown as average marginal effects (AME). This is the average change in the probability that the event of the dependent variable occurs (i.e., a person is highly satisfied with work/standard of living/health) when the independent variable increases by one unit.

6 Findings

6.1 Different types of VET-to-labor market transition patterns

We identified eight clusters to describe the different VET-to-labor market transition patterns (Fig. 2; Table 3). A first important difference between the clusters is whether trainees succeed in obtaining a qualification. While Clusters 1 to 6 included individual trajectories with the acquisition of a qualification (92.4%), Clusters 7 and 8 included individuals with tendencies toward downward dropout (7.6%).

The largest cluster was **Cluster 1**, with direct VET-to-labor market transitions, which comprised approximately 55% of the total sample. Individuals in this cluster had stable employment episodes directly after completing the first VET program. A few individuals (**Cluster 2**, 16.7%) had short-term employment phases alternating with phases of other statuses after completing the first VET program. The largest share in this cluster was male (71.8%), as military service in particular creates a discontinuity in the transition to the labor market.³ Clusters 3 to 5 (17.7%) included individuals who appeared to revise their VET decision after completing the VET program and participated in further institutionalized education in the higher education sector (**Cluster 3**), in an additional VET program (**Cluster 4**), or in general education (**Cluster 5**) after their first VET program. Clusters 6 to 8 (10.5%) contained individuals who experienced a PTT in the first VET program. Individuals who returned to institutionalized education after PTT (horizontal dropout) were assigned to **Cluster 6**. A small share of individuals with a PTT was also found in Clusters 3 to 5—that is, those who, similar to individuals in Cluster 6, experienced a horizontal dropout. Thus, PTTs in Clusters 3 to 6 were different from PTTs in Clusters 7 and 8, as in the former cases, PTTs were primarily related to educational

³ Until 2011, military service was compulsory for able-bodied men in Germany.

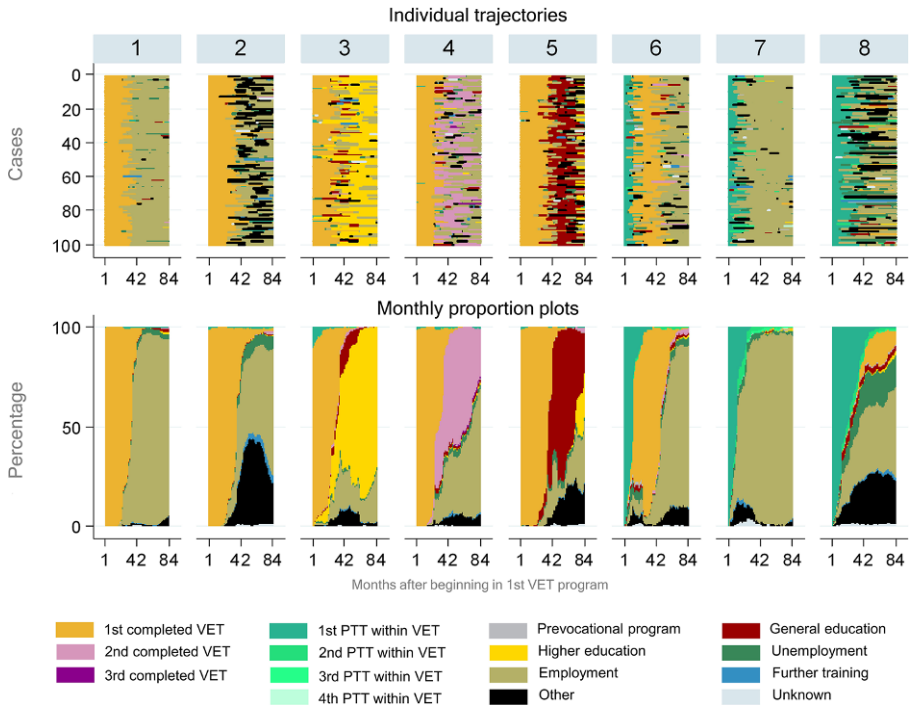


Fig. 2 VET-to-labor market transition patterns. (The above plots show individual trajectories of 100 random selected persons per cluster)

revisions. However, the situation for individuals in Clusters 7 and 8 appeared to be more problematic, as they entered the labor market as unqualified individuals. These two clusters differed in terms of the timing of PTT and subsequent trajectories (Table 2, Fig. 2). **Cluster 8** included individuals who changed their status more frequently after their PTT, had shorter employment spells, and experienced unemployment more frequently than those in **Cluster 7** (Table 2). Individuals in Cluster 7 tended to have shorter periods of training prior to their PTT and entered employment immediately after their PTT.

Table 2 also includes a descriptive distribution of the proportion of individuals who stated high values of SW, SSL, and SH in the VET-to-labor market transition patterns. Mean comparisons suggest significant differences between the clusters in SWB (SW: $\chi^2(7)=24.7, p<0.001$; SSL: $\chi^2(7)=119.4, p<0.001$; SH: $\chi^2(7)=62.4, p<0.001$). In particular, individuals with a tendency toward downward dropout (Clusters 7 and 8) less frequently reported high values of SSL and SH. Cluster 8 also had the lowest proportion of individuals with high SW and also contained the largest proportion of individuals with no or low school-leaving qualifications. On the one hand, this confirms the well-known finding that these individuals have the highest risk for PTT (Rohrbach-Schmidt and Uhly 2015; Michaelis and Richter 2022); on the other hand, it indicates the potential negative consequences for further course of life if trainees do not participate in further education. Moreover, Cluster 8 has the

Table 2 Descriptive information of subsequent trajectory clusters within 84 months after PTT

Characteristics	1	2	3	4	5	6	7	8
<i>n</i>	5541	1673	933	535	309	296	272	489
In %	55.1	16.7	9.3	5.3	3.1	2.9	2.7	4.9
Average changes of status	2.8	4.1	4.0	4.4	4.7	4.8	3.4	4.4
Average time in status (in months)								
1st PTT within VET	0.3	0.5	1.1	0.4	0.2	11.6	11.3	22.4
2nd PTT within VET	0.0	0.0	0.0	0.0	0.0	0.6	1.9	2.1
3rd PTT within VET	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.3
4th PTT within VET	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st completed VET	33.3	37.1	27.5	29.5	36.4	31.3	0.2	5.9
2nd completed VET	0.1	0.2	0.5	26.4	0.2	1.1	0.0	0.0
3rd completed VET	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Prevocational programs	0.0	0.1	0.0	0.1	0.1	0.4	0.1	0.5
General education	0.4	0.2	3.1	1.0	26.4	1.1	0.1	2.6
Higher education	0.1	0.1	37.5	0.3	2.4	0.3	0.2	0.6
Unemployment	1.5	3.2	0.9	2.0	1.7	2.7	2.0	10.3
Employment	47.1	23.5	9.9	20.6	8.8	30.2	63.4	22.5
Further training	0.1	1.6	0.2	0.3	0.2	0.2	0.5	0.8
Else	0.7	17.1	3.0	2.7	7.1	4.1	2.8	15.3
Unknown	0.2	0.5	0.2	0.2	0.4	0.4	0.8	0.9
Further general characteristics (in %)								
No or low school-leaving qualification	39.0	48.5	3.7	37.1	41.4	40.7	49.3	57.6
Participation in pre-vocational program before VET	7.3	6.6	4.1	7.3	4.2	8.1	9.6	9.6
Participation in higher education before VET	2.3	1.1	5.9	1.7	0.0	0.3	5.9	1.8
Currently unemployed	3.2	5.1	1.9	3.2	2.9	6.8	8.5	13.3
Sex (female)	58.3	28.2	41.9	50.8	19.1	62.8	62.1	54.8
Migration background	16.0	19.7	15.0	14.2	18.8	17.6	30.1	24.8
Low parental education	14.0	14.6	6.0	9.3	9.7	11.7	28.0	23.4
Lives in eastern federal state	7.6	8.8	9.8	8.4	7.1	10.1	5.9	12.5
Lives solitarily	17.0	17.0	15.9	19.1	20.1	16.6	24.6	23.4
Income								
Net income per member in the household (in hundred €)	14.9	14.3	20.3	15.9	17.9	13.2	13.1	11.2
Age information (mean)								
Age (2007)	44.6	45.4	39.7	42.9	44.2	41.6	47.3	42.2
Age at beginning of VET	16.8	16.3	18.6	16.6	16.1	16.7	17.4	16.7

Table 2 (Continued)

Characteristics	1	2	3	4	5	6	7	8
Personality constructs (mean)								
Extraversion (z-stand.)	0.022	-0.038	-0.005	0.067	-0.162	0.000	-0.067	-0.039
Agreeableness (z-stand.)	0.024	-0.057	-0.013	0.052	-0.134	-0.032	0.058	-0.038
Conscientiousness (z-stand.)	0.044	0.007	-0.210	0.027	-0.166	-0.022	0.045	-0.063
Neuroticism (z-stand.)	0.022	-0.114	-0.057	-0.005	-0.095	0.059	0.181	0.175
Openness (z-stand.)	-0.053	-0.056	0.184	0.103	0.214	0.115	0.034	0.105
SWB (in %)								
(1) High satisfaction with work (SW)	50.3	51.0	46.5	48.6	47.0	46.1	48.1	39.6
– Missing Values in SW	8.7	10.2	3.4	7.7	7.1	9.8	10.7	14.3
(2) High satisfaction with standard of living (SSL)	51.7	46.1	58.1	51.2	52.8	44.6	40.4	32.1
(3) High satisfaction with health (SH)	49.6	47.6	58.1	52.0	54.7	46.3	38.2	41.5

To describe control variables imputed data was used

highest proportion of missing values in SW, thereby indicating more frequent long-term unemployment since they began the NEPS survey, which could also be an effect of discontinuities in school-to-work transitions. Cluster 7 differed from Cluster 8 in terms of SW and SSL. Here, individuals reported high SW ($p < 0.05$) and SSL ($p < 0.05$) significantly more often. In contrast, individuals with multiple qualification trajectories (Clusters 3 to 5) more often appeared to experience high SSL and SH. It can be assumed that higher qualifications improved labor market opportunities and had a positive effect on different constructs of SWB. The distribution of SWB categories was relatively balanced in Cluster 1. Based on this result and the fact that we found idealistic transitions from VET to the labor market in Cluster 1, this cluster was used as the reference category in subsequent regression analyses.

6.2 Influence of VET-to-labor market transition patterns on subjective well-being

Tables 3, 4 and 5 present the regression results regarding individuals' SW, SSL, or SH. The strongest effects were observed for Cluster 8, in which the probability of high SW, SSL, or SH decreased, on average, by 8.1 to 19.3 percentage points when no other variables were controlled for (M0b). Significant effects were also found for Cluster 7, although the effects predicting SW and SSL were less pronounced than those for Cluster 8. In M0b, the influence of Cluster 7 on SH was stronger than the effect of Cluster 8 on SH, but the effect of Cluster 7 reduced by integrating the control variables in the regression models (models M1 to M3). Descriptive statistics indicated differences between Clusters 1 and 6 (Table 2); however, the effects of Cluster 6 were not significant in the logistic regression models that predicted high SW or SH. It only slightly decreased the probability of high SSL values by an average

Table 3 Binomial logistic regression models to predict high satisfaction with work (SW) by different VET to labor market transition patterns

Independent Variables	M0a	M0b	M1	M2	M3
Cluster 1 (reference)	–	–	–	–	–
Cluster 2	–	0.007	0.012	0.012	0.017
Cluster 3	–	–0.039*	–0.013	–0.016	–0.028
Cluster 4	–	–0.018	–0.015	–0.015	–0.017
Cluster 5	–	–0.033	–0.013	–0.015	–0.023
Cluster 6	–	–0.043	–0.035	–0.034	–0.023
Cluster 7	–	–0.022	–0.008	–0.006	0.010
Cluster 8	–	–0.107***	–0.084**	–0.081**	–0.062*
Control Variables					
No or low school-leaving qualification	0.004	–	–	–0.009	0.004
Participation in prevocational program before VET	–0.029	–	–	–0.035	–0.031
Participation in higher education before VET	0.034	–	–	0.033	0.031
Net income per member in the household (in hundred €)	0.002***	–	–	–	0.002***
Currently unemployed	–0.269***	–	–	–	–0.267***
Age (2007)	0.001	–	0.001*	0.001*	0.001
Sex (female)	0.034**	–	0.035**	0.033**	0.035**
Migration background	0.004	–	0.000	0.001	0.004
Age at beginning of VET	–0.008*	–	–0.006*	–0.007*	–0.007*
Low parental education	–0.001	–	–0.008	–0.007	–0.001
Lives in eastern federal state	–0.026	–	–0.040*	–0.043*	–0.025
Lives solitarily	–0.065***	–	–0.062***	–0.062***	–0.065***
Extraversion (z-stand.)	0.031***	–	0.032***	0.032***	0.031***
Agreeableness (z-stand.)	0.029***	–	0.028***	0.028***	0.028***
Conscientiousness (z-stand.)	0.030***	–	0.029***	0.029***	0.030***
Neuroticism (z-stand.)	–0.053***	–	–0.056***	–0.055***	–0.053***
Openness (z-stand.)	–0.001	–	–0.001	–0.001	0.000
Pseudo R ²	0.051	0.003	0.041	0.042	0.052
N	9172	9172	9172	9172	9172

Average marginal effects; the significance levels refer to the AME coefficients: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

of 6.9 percentage points for individuals who belonged to Cluster 6 (Table 4, M0b). However, this effect became non-significant when we integrated control variables (models M1 to M3), which suggests complex interactions. Thus, H1—which stated that VET-to-labor market transition patterns including PTT led to lower SWB—was confirmed only for the transition patterns that indicated a tendency toward downward dropout (Clusters 7 and 8). In contrast, the results of Cluster 6 can be interpreted as constructive corrections of the training decision, which have less of an adverse effect on SWB later in life.

Table 4 Binomial logistic regression models to predict high satisfaction with standard of living (SSL) by different VET to labor market transition patterns

Independent Variables	M0a	M0b	M1	M2	M3
Cluster 1 (reference)	–	–	–	–	–
Cluster 2	–	–0.055***	–0.038**	–0.038**	–0.028*
Cluster 3	–	0.064***	0.086***	0.073***	0.034
Cluster 4	–	–0.004	0.008	0.006	–0.004
Cluster 5	–	0.011	0.047	0.040	0.008
Cluster 6	–	–0.069*	–0.054	–0.052	–0.035
Cluster 7	–	–0.110***	–0.098**	–0.089**	–0.068**
Cluster 8	–	–0.193***	–0.153***	–0.141***	–0.104***
Control Variables					
No or low school-leaving qualification	–0.040**	–	–	–0.068***	–0.033**
Participation in prevocational program before VET	–0.041*	–	–	–0.043*	–0.037
Participation in higher education before VET	0.012	–	–	0.018	0.013
Net income per member in the household (in hundred €)	0.011***	–	–	–	0.011***
Currently unemployed	–0.188***	–	–	–	–0.180***
Age (2007)	0.003***	–	0.004***	0.005***	0.003***
Sex (female)	0.058***	–	0.057***	0.046***	0.058***
Migration background	–0.034**	–	–0.048***	–0.045**	–0.030*
Age at beginning of VET	–0.003	–	0.005*	–0.002	–0.003
Low parental education	–0.030*	–	–0.049**	–0.041**	–0.026
Lives in eastern federal state	–0.091***	–	–0.112***	–0.118***	–0.089***
Lives solitarily	–0.203***	–	–0.161***	–0.160***	–0.199***
Extraversion (z-stand.)	0.009	–	0.013*	0.014*	0.009
Agreeableness (z-stand.)	0.010	–	0.007	0.007	0.010
Conscientiousness (z-stand.)	0.028***	–	0.026***	0.027***	0.028***
Neuroticism (z-stand.)	–0.028***	–	–0.033***	–0.032***	–0.027***
Openness (z-stand.)	–0.001	–	0.000	–0.001	–0.001
Pseudo R ²	0.079	0.012	0.058	0.062	0.083
N	10,046	10,046	10,046	10,046	10,046

Average marginal effects; the significance levels refer to the AME coefficients: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Further, educational adjustments, in which individuals return to general education (Cluster 5) or enter higher education after the first VET program (Cluster 3), had only partial effects on SWB constructs. The effect of Cluster 3 on SSL was consistent with H2 (higher SWB for transition patterns that include additional education outside of VET). Here, the probability of high SSL increased, on average, by 6.4 to 8.6 percentage points (Table 4, M0b1 to M2). Additionally, in some models, the probability of high SH increased when individuals belonged to Clusters 3 or 5 (Table 5, M0b1 to M2). However, the effects were non-significant when controlling for the current employment and income situation. The fact that the effects became

Table 5 Binomial logistic regression models to predict high satisfaction with health (SH) by different VET to labor market transition patterns

Independent Variables	M0a	M0b	M1	M2	M3
Cluster 1 (reference)	–	–	–	–	–
Cluster 2	–	–0.020	–0.013	–0.013	–0.009
Cluster 3	–	0.084***	0.040*	0.035	0.026
Cluster 4	–	0.023	0.009	0.008	0.006
Cluster 5	–	0.050	0.059*	0.056*	0.051
Cluster 6	–	–0.033	–0.054	–0.054	–0.048
Cluster 7	–	–0.114***	–0.076*	–0.072*	–0.063*
Cluster 8	–	–0.081***	–0.081***	–0.077**	–0.060*
Control Variables					
No or low school-leaving qualification	–0.019	–	–	–0.023	–0.012
Participation in prevocational program before VET	–0.015	–	–	–0.016	–0.013
Participation in higher education before VET	–0.044	–	–	–0.042	–0.043
Net income per member in the household (in hundred €)	0.002***	–	–	–	0.002***
Currently unemployed	–0.150***	–	–	–	–0.143***
Age (2007)	–0.009***	–	–0.009***	–0.009***	–0.009***
Sex (female)	0.009	–	0.014	0.011	0.013
Migration background	0.007	–	0.005	0.006	0.010
Age at beginning of VET	0.002	–	0.003	0.002	0.002
Low parental education	–0.021	–	–0.025	–0.022	–0.017
Lives in eastern federal state	–0.006	–	–0.015	–0.017	–0.005
Lives solitarily	–0.056***	–	–0.051***	–0.050***	–0.053***
Extraversion (z-stand.)	0.009	–	0.010	0.010	0.009
Agreeableness (z-stand.)	0.021**	–	0.020**	0.020**	0.020**
Conscientiousness (z-stand.)	0.024***	–	0.024***	0.025***	0.025***
Neuroticism (z-stand.)	–0.061***	–	–0.063***	–0.063***	–0.061***
Openness (z-stand.)	–0.005	–	–0.006	–0.006	–0.005
Pseudo R ²	0.006	0.006	0.066	0.066	0.071
N	10,048	10,048	10,048	10,048	10,048

Average marginal effects; the significance levels refer to the AME coefficients: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

non-significant in M3 does not go against H2. Rather, it reflects complex interactions with better employment and income situations later in life. However, the negative effect of Cluster 3 on SW in M0b argues against H2, but this effect disappeared in the comprehensive controlled models (Table 3, M1 to M3).

Moreover, we were interested in ascertaining the effects of transition patterns including multiple successfully completed VET programs (Cluster 4). For Cluster 4, the regression models reveal no significant effects for each of the SWB domains. Hence, H3 is supported.

By integrating control variables, for all cluster effects that significantly affected SWB, the constructs in M0b were reduced or became insignificant. However, we found that particularly for the PTT, the initial effects on SWB in Clusters 7 and 8 (negative effects on SSL and SH for both clusters; negative effect on SW for Cluster 8) remained significant, even when controlling for current employment and income situation however, the effect sizes decreased (M3 and H4). This suggests long-term affective disadvantages of a PTT when no education and training revisions are made, even if individuals are not disadvantaged in their subsequent employment and income situations. However, the effects of the other clusters also decreased after controlling for the current employment and income situation, which also supports H4. For a more differentiated analysis, we evaluated interactions of VET-to-labor market transition patterns and the current employment and income situation (Online Resources 2 and 3). We found small, positive, and significant interaction terms for Cluster 7 on SSL and SH with the current income situation (interaction terms with current unemployment are not significant). Thus, SWB may increase for this subgroup but only due to a much higher income (several hundred euros per member in the household).

7 Discussion and conclusion

7.1 General discussion

In many countries, VET is an important qualification system for the labor market. However, trajectories from VET to the labor market are not standardized; previous studies have already illustrated that VET-to-labor market transitions are heterogeneous (Achatz et al. 2022; Baas and Philips 2017; Brzinsky-Fay 2007). PTT, as well as participation in multiple VET programs or in higher education, can shape individual transition trajectories. Thus far, evidence on the consequences of different VET-to-labor market transitions has been scarce. Therefore, the present study analyzed the VET-to-labor market transition patterns of German trainees and the consequences of these on the subdimensions of SWB (SW, SSL, SH) in later life. We identified eight disjunctive VET-to-labor market transition patterns. These include direct transitions to employment (Clusters 1 and 2); transitions to further institutionalized education in higher education, VET, or general education (Clusters 3 to 5); and transitions with a PTT in the first VET program (Clusters 6 to 8). The latter three clusters can be further distinguished in terms of the types of PTT. Individuals in Cluster 6 complete a (different) VET program after their PTT (*horizontal dropout*, i.e. educational decisions are adjusted), individuals in Clusters 7 and 8 portray actual *downward dropouts* that leave the VET system without formal qualifications.

The results indicate that a differentiation of VET-to-labor market transition patterns is necessary to generate new insights into the outcome and, thus, long-term effects of VET. In particular, in the context of dropouts of VET or achieving further qualifications after a VET certificate, this study generates new findings that are relevant for current discussions on education policy and are discussed below.

First, the results of this study demonstrate the importance of distinguishing different types of dropouts from VET. Previous studies have already indicated that PTTs can have different effects on the subsequent life course of an individual, particularly in the course of education (Krötz and Deutscher 2022; Michaelis and Richter 2022; Patzina and Wydra-Somaggio 2020). Our results reveal that almost all PTTs without a return to institutionalized education (downward dropout) achieved lower SWB later in life. Here, the strongest disadvantages are experienced by those with fragmented trajectories after a PTT. Even when the current employment and income situation is controlled for, a significant number of these individuals show a lower probability of achieving high SW, SSL, or SH. Thus, we show that a failure in VET is related to clear disadvantages in the course of later life that are not only reflected in employment and income effects (Patzina and Wydra-Somaggio 2020, 2021).

In principle, if individuals returned to institutionalized education (VET, general, or higher education) after a PTT (horizontal or upward dropout), their SWB later in life was not significantly negatively lower than the SWB of individuals with direct VET-to-labor market transitions. However, a return to VET after a PTT may also reduce the probability of achieving high SSL later in life if control variables are not considered. The exact causes cannot be identified in our study, as complex interactions with the life course after the VET-to-labor market transition have to be assumed. The results suggest that a PTT without a revision of education and training could be a critical turning point in the life course. Thus, with regard to different types of dropouts, our findings reinforce the importance of strategies to prevent early leaving from education and training (Psifidou et al. 2021) in order to counteract long-term effects on individuals' SWB.

Second, our study also provides insights into the consequences of multiple qualifications by VET and higher qualification after VET. There are advantages regarding SSL and SH if individuals acquire a qualification in higher education after VET, which is probably related to better employment and income opportunities. Interestingly, our findings show that higher qualifications did not influence SW in the long term compared to direct VET-to-labor market transitions. Thus, additional investment in education does not necessarily lead to better satisfaction with work. However, the results must be interpreted with caution against the background of the value of VET and higher education, as no comparisons were made with direct transition patterns from higher education to the labor market. Nevertheless, the results indicate an overall improvement in opportunities later in life by combining VET and higher education in comparison to direct VET-to-labor market transitions. In turn, multiple qualifications by VET had no effect on SWB in later life. This adds to existing findings on the effect of additional education on SWB (e.g., Clark et al. 2001; Diener et al. 1999) and shows that the *type* of additional education seems to be crucial.

7.2 Limitations and further research

This study has certain limitations that must be considered when interpreting the results. First, due to the dynamic complementarities between education, work, and family (Autorengruppe Bildungsberichterstattung 2018), the results should not be

interpreted causally. In particular, we neglected trajectories between our observation of VET-to-labor market transitions and the SWB measurement later in life. This could be one explanation for the low R^2 obtained in the regression models. Additionally, the integration of the current income and employment situation (M3) as well as relating interactions terms with VET-to-labor market transition pattern suggest already complex relationships with the entire course of life and SWB. Therefore, mediation analyses can help to throw more light onto the relationship between SWB, the current income and employment situation, as well as belonging to a specific VET-to-labor market transition pattern. Furthermore, the relationship between PTT and SH must be interpreted with caution. We cannot assume causality here, as we have no information regarding health problems during educational trajectories, which could also be a reason for discontinuous trajectories.

Second, the VET-to-labor market transitions of start cohort 6 of NEPS do not reflect transitions into the labor market of recent date. In addition, in the dataset, the measurement of SWB occurred only since 2007. Thus, we can focus only on long-term effects but not on the development of SWB after VET. A longitudinal analysis of SWB after leaving VET and its influence on different subsequent transition patterns could also be of interest in future research. Lastly, a differentiation of the two VET systems in Germany (dual and school-based VET system) or an occupation-specific analysis could reveal more differentiated findings. However, a larger sample with stronger occupational representativeness is necessary for this last aspect. Further analysis could also concentrate on interaction effects with other predictors of SWB, such as personality constructs.

7.3 Conclusion

As the comparison of different VET-to-labor market transition patterns illustrates strong in-between differences in the SWB of trainees in their later life, analyses of the outcome of VET should not only distinguish between formal qualifications, which neglect the individual vocational adjustment. This study clarifies that a differentiation of educational trajectories yields more nuanced results. In addition, since PTT affects the long-term SWB of individuals, there is a need to support adolescents who drop out of VET in finding subsequent educational opportunities (e.g., different VET programs). This is important in order to secure the acquisition of relevant labor market skills, social share, as well as equal opportunities (Baethge et al. 2006, p. 11 f.) of trainees with a PTT and, thus, to prevent a deterioration of individuals' SWB.

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Conflict of interest C. Michaelis and S. Findeisen declare that they have no competing interests.

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