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Explaining higher VET dropout rates among adolescents with a migration background in Germany: the role of career compromises

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Abstract

Research has consistently revealed that adolescents with a migration background are more likely to drop out from vocational education and training (VET) at the upper-secondary level than their native peers. While recent research has provided rich empirical evidence of mechanisms leading to dropouts from VET, little is known about such mechanisms for adolescents with a migration background. In our contribution, we assume that the difficulties that adolescents with a migration background face when entering the VET system are associated with a restricted range of occupational opportunities and, thereby, higher levels of career compromises in terms of the desired and attained VET occupation. Following previous findings on key dimensions of career compromise, we examine the relevance of compromises in the field of work and social status in explaining the higher propensity of adolescents with a migration background to drop out from their first VET position. Using logistic regressions and KHB decomposition analyses, our results underline that gaps in VET dropout rates between adolescents with and without a migration background can partially be ascribed to migration-specific compromises in the field of work between the aspired and attained VET occupation, while compromises in social status seem to be unimportant.

Introduction

The transition to a VET program and its completion is central for a smooth school-to-work transition and successful occupational careers (Authoring Group Educational Reporting 2022; Cedefop 2013; Quintini and Manfredi 2009). In many countries, a substantial proportion of trainees drop out from initial vocational education and training (VET), which often has a negative impact on further participation in education and training, on the transition to skilled employment and on career progression (OECD 2005, 2023b; Patzina and Wydra-Somaggio 2020). Dropping out from VET can be the result of trainees' decision to leave initial VET before achieving a formal vocational qualification (in line with Böhn and Deutscher 2022). According to previous studies (Michaelis and Findeisen 2024), four out of five training contracts are terminated based

on trainees' decision, while a termination of a training contract is less often initiated by the training company. Following this perspective, VET dropout can be seen as the result of a decision-making process. Yet, trainees' decision to leave initial VET can be made either voluntarily or under external pressure from the training company, and it does not always mean that young people leave VET permanently, as many trainees who leave their first VET program switch to another occupation or company (Holtmann and Solga 2023).

Research has revealed that trainees with a migration background¹ face a higher dropout risk in VET programs than their native peers (Böhn and Deutscher 2022; Michaelis and Richter 2022; Nießen et al. 2020; Rohrbach-Schmidt and Uhly 2015). While approximately 40% of trainees with a migration background drop out from their VET program, this is only the case for 31% of trainees without a migration background (Authoring Group Educational Reporting 2022). This pattern of higher VET dropout rates among adolescents with a migration background has been found across different countries (Germany: Michaelis and Richter 2022; England: Gambin and Hogarth 2016; Netherlands: Meeuwisse et al. 2010; China: Yi et al. 2015). While recent research has provided ample empirical evidence on the mechanisms that lead to dropout from VET in general (Beckmann et al. 2023; Böhn and Deutscher 2022; Krötz and Deutscher 2022; Michaelis and Findeisen 2022; Michaelis and Richter 2022), little is known regarding the factors that bring about the higher dropout rate among adolescents with a migration background. In our contribution, we focus on how and by what factors the higher VET dropout rate of adolescents with a migration background is explained. Following previous findings on key dimensions of career compromise (Ahrens et al. 2021; Beckmann et al. 2023), we assume that dropouts, regardless of whether observed for adolescents with or without a migration background, are related to career compromises. However, adolescents with a migration background are forced to make career compromises more often than their native peers (Schels and Schwarz 2020), which may lead to a higher dropout rate among immigrants.

Given that individuals face various restrictions when making educational or vocational choices, career compromises occur when individuals are not successful in realizing their preferred educational or vocational choice. We expect that adolescents with a migration background are particularly vulnerable for career compromise as they often show high aspiration levels (Beicht and Walden 2019; Kamm et al. 2023; Salikutluk 2016), tend to underperform in school (Authoring Group Educational Reporting 2020; Birkelund 2020; OECD 2023a), and face more difficulties when applying for jobs or apprenticeships (Fibbi et al. 2006; Nennstiel 2022; Protsch and Solga 2017), which ultimately can lead to higher levels of career compromises in terms of the desired and attained training occupations. The higher dropout rate among adolescents with a migration background may therefore merely reflect a higher mismatch between what migrants aspire to and what they are able to achieve in the education and training system. A high fit between occupational goals and the realized training occupation is valued higher by adolescents than income or other benefits (Glauser 2015; Möser et al. 2019). Therefore, failures in

¹ Following Becker et al. (2023), in this manuscript, the term migration background refers to families' immigration experience, which is linked to our phenomena of interest—career compromises and VET dropout. Here, migration background refers to students whose parents were born abroad (see methods section). However, it has to be underlined that the use of the term "migration background" is highly debated owing to its "detrimental capacity to reify ethnic categories" (Elrick and Farah Schwartzmann 2015, p. 1539; see also Borrelli and Ruedin 2024).

realizing a desired VET position may result in an adaptation or compromise of occupational plans in order to prevent remaining without a VET position. The greater the compromise that individuals face, the higher the propensity of young people to drop out from VET (Beckmann et al. 2023). Building on the aforementioned assumptions and given the overall relevance of career compromises for dropping out from VET, our aim is to empirically disentangle the extent to which migration-related differences in VET dropout rates can be attributed to a higher likelihood of experiencing career compromises. To address our research goal, we use longitudinal data on 4004 trainees from the German National Educational Panel Study (NEPS).

The present study addresses important research gaps. Our study builds on an important strand of research on the consequences of compromise in the transition from school to work and extends it in two ways. First, research on the relationship between migration background and career compromises is limited. Second, it is yet not understood how eventual career compromises are associated with the higher probability of dropping out from VET among adolescents with a migration background. By addressing these research gaps, our study may provide useful insights into relevant factors that shape migration-related differences in dropouts from VET. This study may therefore provide valuable insights for educators, while also guiding policies and interventions aimed at reducing VET dropouts by identifying factors that amplify the risk of dropping out from VET among adolescents with a migration background.

The remainder of this paper is structured in the following manner: After describing the German context of VET and its opportunity structure, we provide a summary of previous research on dropouts of VET. We then discuss why we expect that adolescents with a migration background face higher career compromises compared to natives and how different types of career compromises are related to immigrants' higher VET dropout. After introducing the data and analysis strategy, we present our results and conclude with a discussion.

Opportunity structure in the German VET system

In the German secondary school system—characterized by a high degree of stratification and early tracking—students can earn one of three school certificates arranged in a hierarchical order. By completing Grade 9 (typically at age 15), students receive a basic school certificate (*Hauptschulabschluss*). After completing Grade 10 (usually at age 16), they can obtain an intermediate school certificate (*Mittlerer Schulabschluss*). Finally, upon completing Grade 12 (or Grade 13 in certain federal states), students can obtain an upper secondary school certificate (*Abitur*).

After graduating from secondary school, one of the dominant pathways for school leavers in Germany is entering VET programs, either in the dual system (company-based VET) or school-based VET in full-time vocational schools (Michaelis et al. 2022). At the end of company- and school-based VET, trainees can achieve a vocational qualification (at ISCED level 3b; Cedefop 2020). On average, about 700'000 adolescents entered VET programs annually between 2010 and 2021, while 69% of them are in company-based VET programs (own calculations based on Federal Statistical Office 2022). VET programs are mainly attended by adolescents who graduated with a basic or intermediate school certificate (approximately 78%), while only a small share of upper secondary

school graduates enter VET programs (approximately 22%; see Authoring Group Educational Reporting 2022; own calculations based on table E1-4web).

Students' opportunities to access VET programs strongly depend on the school certificates they attained in the secondary school system. In Germany, students with a migration background are more likely to graduate from secondary school with lower school certificates (e.g. a basic school certificate) than students without a migration background (Busse 2020; Busse et al. 2023; Michaelis and Busse 2022; Dollmann and Weismann 2020). This narrows down their possibilities to enter various VET programs, as the access depends largely on indicators of school achievement (e.g., school certificates). For example, companies' selection criteria are mainly focused on applicants' school certificates, as they represent productivity signals for employers (see our theoretical framework for details), while the entry requirements for school-based VET programs are more formalized. For most school-based VET programs, an intermediate school certificate is required (Seeber et al. 2019b). As a result, students with a migration background may be unable to access certain training occupations because of their usually lower school certificates (Authoring Group Educational Reporting 2020), thereby forcing them to make compromises in their occupational choices. However, compromises in occupational choices are not only related to school certificates but may also be reinforced by the fact that adolescents with a migration background face greater difficulties in applying for apprenticeships (Nennstiel 2022).

It is also plausible to expect that adolescents have to make compromises more often if the given opportunity structure of the regional VET market is less favorable (Flohr et al. 2020; Glauser and Becker 2016; Wefling et al. 2015, 2023). For instance, a higher competition for training places at the regional VET market is associated with a lower probability of entering VET programs (Michaelis and Busse 2021). Thus, adolescents in regional VET markets with a higher competition for training places may be more likely to face difficulties in realizing their occupational aspirations. In the last decade, the ratio of supply and demand for training places has become more balanced, indicating a lower competition for training places. However, at the same time, the German VET market faces a growing occupational mismatch, as adolescents' occupational aspirations and the demand on the labor market have become less congruent (Dummert et al. 2019; Seeber et al. 2019a).

Previous research on VET dropout

Before we outline our theoretical background regarding the relationship between migration background, career compromises and VET dropout, we will briefly summarize relevant findings from prior research on dropout from VET. Previous studies (e.g., Holtmann and Solga 2023; Böhn and Deutscher 2022) revealed that trainees' decision to drop out from VET is influenced by manifold reasons. The majority of studies underlined the importance of individual (e.g., migration background; see, e.g., Böhn and Deutscher 2022) and structural characteristics of the respective occupations as well as the companies and vocational schools providing the training. The following summary focuses on individual reasons for VET dropout as they have been found to be of crucial relevance for trainees' VET dropout.

An important individual characteristic in studies of VET dropout is individuals' migration background (Böhn and Deutscher 2022; Gambin and Hogarth 2016; Meeuwisse et

al. 2010; Michaelis and Richter 2022; Nießen et al. 2020; Rohrbach-Schmidt and Uhly 2015). For example, Michaelis and Richter (2022) reported that compared to native trainees, trainees with a migration background are eight percentage points more likely to drop out from a VET program before acquiring a vocational qualification. The trainees' previous school achievement is another important individual factor that has been shown to influence dropout from VET. Research consistently reported that lower school-leaving certificates (Holtmann and Solga 2023; Laporte and Mueller 2013; Rohrbach-Schmidt and Uhly 2015) and poorer school grades (Holtmann and Solga 2023; Michaelis and Richter 2022) are associated with a higher risk of VET dropout. Some studies pointed out that the strong relationship between trainees' prior school achievement and VET dropout may be due to trainees' difficulties to meet the respective training requirements (Holtmann and Solga 2023; Michaelis and Richter 2022). Findings on the relevance of cognitive, language, and socioemotional skills in predicting VET dropout showed less consistent patterns. Some studies reported that higher cognitive skills (e.g., mathematical competence: Holtmann and Solga 2023; domain-specific competence: Ma et al. 2024) predict the risk of dropping out from VET, while other studies found no such association (Eegdeeman et al. 2018). Empirical evidence on the influence of language skills on the probability of dropping out from VET is still scarce but suggests that better language skills are associated with lower dropout rates. In addition, research on dropout from VET pointed to the relevance of socioemotional skills (Holtmann and Solga 2023; Schmid and Heukedal 2022). Yet, compared to the effect sizes of school-leaving certificates, the effect sizes of cognitive, language and socioemotional skills were rather small (e.g., Holtmann and Solga 2023).

Another important body of research highlighted the relevance of occupational aspirations and choices in the context of VET dropouts. Existing studies consistently reported that the degree to which individuals' occupational aspirations fit with the realized training occupation was associated with the risk of dropping out from VET. Not being able to attain the desired training occupation was associated with a higher risk of dropping out from VET (Beckmann et al. 2023; Holtmann and Solga 2023; Michaelis and Findeisen 2022). According to Holtmann and Solga (2023) access to the desired training occupation explained most variance in VET dropout compared to other important predictors such as trainees' school-leaving certificate or various domain-specific skills.

In summary, the existing research on VET dropout has the following shortcomings: (1) Although previous studies have largely focused on individual factors of dropping out from VET programs (for an overview see Böhn and Deutscher 2022), analyses of the underlying mechanisms of the influence of individual factors are still scarce. (2) Research on possible explanations for the association between dropout risk and migration background is limited. It may be expected that the aforementioned factors partly mediate the impact of migration background on dropout risk. (3) It is unclear whether and to what extent career compromises need to be taken into account to explain part of the association between migration background and VET dropout.

Theoretical framework and research evidence

Stages of career compromises

Deciding on a specific VET program and finding a training place is an essential part of the career choice process (Sharf 2013). Gottfredson's (1981, 1996) dynamic concept of

occupational choice describes how occupational aspirations develop during adolescence and become increasingly realistic. We briefly outline the core assumptions of Gottfredson's theory (1981, 1996) and point out the developmental stage of occupational choice to which our study relates. According to Gottfredson (1981, 1996), in a first step of circumscription, children and adolescents categorize occupations along three key dimensions: *gender type*, *social status*, and *field of work*. Gottfredson's theory suggests that based on comparisons of different occupations with their self-concept (i.e., one's self-perception) and the aforementioned dimensions, individuals create a field of acceptable occupational alternatives and reject occupations beyond these borders (Gottfredson 1981, pp. 547–548). In other words, individuals form their occupational preferences for a certain field of work within the social space of acceptable occupations (Gottfredson 1981). In the subsequent stage of compromise, adolescents increasingly take the given opportunity structure into account, gradually abandon those occupations they deem unavailable or inaccessible, and form increasingly realistic occupational aspirations (Gottfredson 1996, p. 187). One challenge adolescents face is the formation of occupational aspirations that correspond to the competitive and segmented VET market (Becker and Glauser 2016; Kleinert and Jacob 2013; Salvisberg and Sacchi 2014; Schels and Abraham 2023; Tomasik et al. 2009).

The process of compromising intensifies as adolescents approach their first occupational decision (e.g., Schels and Abraham 2023). At this stage, which is focused upon here, adolescents strive to secure a feasible VET position in a specific occupation that is closest to their occupational aspirations. However, adolescents cannot always realize their occupational aspirations. Often adolescents have to make compromises in realizing their occupational aspirations when finding and entering VET positions—that is, they turn toward VET position in specific occupations that are accessible and acceptable to them but less preferred compared to their prioritized occupation (Schels et al. 2022). However, compromises in realizing occupational aspirations may also be related to the chances of getting a VET position at all in the largely competitive VET market (Tomasik et al. 2009). Among other reasons, this may be because due to structural factors such as formal entry requirements or imbalances between the supply and demand of VET positions that constrain adolescents' occupational choices (Kleinert and Jacob 2013). Adolescents have to make occupational choices within the constraints and opportunities of the segmented and largely market-based VET system (Heckhausen and Tomasik 2002; Kleinert and Jacob 2013; Protsch and Solga 2016). “The process of compromising comes to a (first) end with the entry in the VET system” (Schels et al. 2022, p. 155). Following previous research (Beckmann et al. 2023; Schels et al. 2022) our study considers this to be the preliminary end point of the compromise process, at which it becomes apparent whether adolescents were able to realize their occupational aspirations or not.

The role of migration background in career compromises

Before turning to how career compromises are associated with a higher probability to drop out from VET among adolescents with a migration background, it is important to outline why these students are more likely to experience career compromises. Yet, there is no theory of career choice or career development that focuses specifically on career compromises of adolescents with a migration background. However, there are various theoretical perspectives and related empirical findings that suggest that a migration

background contributes to career compromises in several ways. Among other factors, experiencing a career compromise when entering a first VET position may reflect individual or group-specific disadvantages in realizing aspirations (Nießen et al. 2022). Since the migration background is closely linked to school performance, some of the anticipated effects may work via disadvantages in (1) *educational achievement* (e.g., OECD 2023a). In addition, migration background is closely related with (2) *social origin* (in terms of parental education, socio-economic status, or social status; see overview regarding the multidimensional construct in Bukodi and Goldthorpe 2013). Both factors influence the opportunities and constraints adolescents face when choosing a VET program (e.g., OECD 2023a).

The strong relationship between *migration background* and *educational achievement* (1) (e.g., OECD 2023a) restricts the field of available occupational options among adolescents with a migration background. While access to company-based VET largely depends on employers' selection criteria (Busse 2020; Protsch 2017), entry requirements are more formalized for school-based VET programs (see section on the German VET system). With regard to the access to company-based VET, applicants' educational achievement represents important productivity signals for employers. In order to assess the suitability of applicants, companies use in particular information on applicants' school performance or standardized vocational tests as selection criteria (Protsch and Solga 2015). Further, in line with arguments from signaling theory (Spence 1973) or the labor queue model (Thurow 1975, 1978), studies revealed that the higher the applicants' level of education and the better their grades and competencies, the more likely they will be invited for internships and finally sign a training contract (Fossati et al. 2020b; Nennstiel 2021; Patzina and Wydra-Somaggio 2020). Given the on average lower educational achievement (Dustmann et al. 2012; Heath et al. 2008; OECD 2016, 2023a) and attainment of adolescents with a migration background (see Authoring Group Educational Reporting 2022; Dollmann and Weißmann 2020; Gries et al. 2022 for Germany; for international findings see: Gabrielli and Impicciatore 2022; OECD 2016), they are more likely to remain without a training contract but less likely to obtain their desired training occupation. For example, Nennstiel (2022) shows that adolescents with a migration background apply for training positions more often than adolescents without a migration background and are less likely to get the training position they applied for. However, while Fibbi et al. (2006) and Thijssen et al. (2021) found evidence that foreign-sounding names or migrants are discriminated against for being invited to job interviews, Fossati et al. (2020b) reported that employers give more weight to the social background of VET applicants as compared to their migration background, as the former may be used as a sign of the expected level of parental support during VET. However, Fossati et al. (2020a) found evidence that HR managers discriminate against applicants with origins that are perceived as culturally distant even when applicants signal higher human or social capital (see also Protsch and Solga 2017 for Germany, Imdorf 2017 and Zschirnt 2020 for Switzerland and Birkelund et al. 2020 for Norway).

Taken together, there is ample empirical evidence that adolescents with a migration background face greater difficulties in entering VET programs not only because of their prior achievement and the school track attended, but also because they have to send in a larger number of applications and are less likely to be called back for an interview than their native peers, even when their cognitive signals are better than those of native

applicants. We assume that due to these conditions, adolescents with a migration background are less likely to realize their desired VET occupation. As a result, in order not to be left without training, adolescents with a migration background are more often urged to begin a VET program in an occupation that does not match their original occupational aspirations, thus increasing their likelihood of dropping out from VET.

Given the *interrelation between migration background and social origin* (2) (e.g., Kalter et al. 2018), a few of the aforementioned associations may work via social differences between adolescents with and without a migration background. First, the usually lower social background of adolescents with a migration background is largely related to immigrants' educational disadvantages (for a summary, see Heath et al. 2008). Second, parents are a crucial source of support and information with regard to occupational orientation (Bryant et al. 2006). Depending on the social background, however, parents have different resources in terms of knowledge and access to information about occupations, the labor market, and the VET system (Dombrowski 2015). Thus, families from lower social backgrounds may be less able to support their children through the process of making an occupational choice. This may also apply to parents with a migration background, as Zimmermann (2024) found that they have significantly less educational knowledge than parents without a migration background.

In sum, these considerations suggest that the usually lower social background and educational achievement of adolescents with a migration background leads to stronger career compromises when entering VET positions.

Career compromises and VET dropout

Consequences of career compromises have been investigated mostly from a socio-psychological perspective (see Beckmann et al. 2023; Nießen et al. 2022; Schels et al. 2022) such as the level of aspiration theory (e.g., Starbuck 1963) or person-environment fit theories (e.g., Edwards and Shipp 2012). These theories suggest that discrepancies between individuals' occupational aspirations and attainment may reduce work-related motivation and satisfaction (Edward and Shipp 2012; Hardie 2014; Michaels and Find-eisen 2022; Tsaousides and Jome 2008). Thus, it can be assumed that adolescents who do not attain the desired occupational aspiration when entering a VET program are more likely of dropping out from VET. While we expect that occupational choices of adolescents with a migration background are strongly restricted in that they are less likely to realize their occupational desires, different types of career compromises can be distinguished. We focus on the relevance of career compromises in the field of work and social status for the higher probability of adolescents with a migration background to drop out of their first VET position. We do not assume that this probability is systematically associated with career compromises in terms of the dimension of gender type as research indicates that adolescents with a migration background have less gender-typical occupational aspirations than their majority peers (Gambaro et al. 2023). Therefore, career compromises in gender type may not only occur less often among adolescents with a migration background but may also be less relevant for their risk of VET dropout.²

² In line with this assumption, further analyses based on our data showed that adolescents with a migration background face career compromises in gender type to a similar extent than adolescents without a migration background (gender-type compromise was constructed based on the share of female employees in both the expected and attained occupation). Additionally, our data revealed that adolescents with a migration background are more likely to aspire

Compromises in social status (i.e., the discrepancy between the social status of an occupation that students aspire to versus the one they achieve) are a crucial aspect in the process of career choice and adjustment (Beckmann et al. 2023). Research conducted in Germany emphasized career compromises with regard to the social status (Nießen et al. 2022) and showed that social career compromises are associated with a higher risk of dropping out from VET (Beckmann et al. 2023). The level-of-aspiration theory (Starbuck 1963) suggests that individuals evaluate their career attainment based on their aspirations which are regarded as a reference point for emotions of success or failure. Unmet career aspirations are associated with lower psychological well-being (Nießen et al. 2023). Falling below the expected social status may be considered a loss of socio-economic resources. If individuals attain a VET position with a lower social status than expected, they may experience negative emotions that increase their risk of dropping out from VET. In contrast, finding oneself in a VET position that has a comparable or higher social status than expected is related to more positive emotions and a lower risk of dropping out from VET (Beckmann et al. 2023). Yet, there are also reasons to assume that upward discrepancies in social status increase the risk of a VET dropout. Beckmann et al. (2023) discuss that finding oneself in an occupation with a higher social status than expected is “related to more complex and cognitively demanding tasks” compared to low-status occupations. This could lead to feelings of cognitive overload. Further, the authors find that both upward and downward discrepancies in social status increase the risk of dropping out from VET.

A multitude of studies reported that adolescents with a migration background show substantially higher levels of occupational aspirations in terms of social status (Beicht and Walden 2019; Busse et al. 2023; McElvany et al. 2018; Plenty and Jonsson 2021; Wicht 2016) but achieve lower levels of occupational attainment than their native peers (Gorodzeisky and Semyonov 2017; Heath et al. 2008). There are different theoretical explanations of why adolescents with a migration background exhibit on average higher levels of aspirations. From the perspective of the concept of immigrant optimism (Kao and Tienda 1995), adolescents with a migration background often strive for upward social mobility (e.g., improvement in socio-economic status; see Dollmann and Weißmann 2020; Hadjar and Scharf 2019; Heath and Brinbaum 2007). Parents may transfer their aspirations to the next generation if they themselves were not able to attain upward mobility (Heath et al. 2008). Thus, second-generation migrants may adopt their parents’ aspirations (Woelfel and Haller 1971; Zimmermann 2019). Given the usually higher occupational aspirations and the on average lower occupational attainment of adolescents with a migration background, social career compromises become more likely. Schels et al. (2022) found that compared to natives, adolescents with a migration background are more likely to experience social career compromises when entering VET. Yet, Schels et al. (2022) reported that they are actually more likely to move upward into VET occupations with a higher social status than the occupations they originally aspired to. In sum, we assume that compared to natives, adolescents with a migration background are more likely to experience social career compromises when entering VET. In addition, we hypothesize that eventual unmet social career compromises are one explanation of migration background gaps in VET dropout.

to female-dominated occupations (where the share of female employees exceeds 70%) and are more likely to enter female-dominated VET positions (with the same share threshold).

H1a Adolescents with a migration background are more likely to experience social career compromises when entering VET positions than adolescents without a migration background.

H1b Social career compromises between adolescents' occupational aspirations and their first VET occupation are associated with the probability of dropping out from VET.

H1c The increased probability of adolescents with a migration background to drop out from their first VET position can be partly attributed to higher social career compromises they face when entering their first VET position.

While social career compromises focus on hierarchical aspects in the process of occupational choices, compromises in the field of work are related to content differences between aspired and attained occupations. Content-related aspects of occupational alternatives can be described in terms of their prototypical profiles of activities, opportunities, and demands (e.g., Flores et al. 2010). Hence, compromises in the field of work reflect unmet interests regarding domain-specific characteristics, such as the most salient activities and tasks characteristic of the desired occupation (Beckmann et al. 2023). Research suggests that occupational interests are a key determinant of adolescents' occupational choices (Glauser 2015; Kayser et al. 2013; Möser et al. 2019; Volodina and Nagy 2016). For example, Volodina and Nagy (2016) analyzed 10th grade students' occupational choices during the transition to VET programs in Germany and found that occupational interests are the most important predictor of the field of work they will select after leaving school.

From the perspective of the person-environment fit theory, finding an occupation that is congruent with adolescents' needs (e.g., interests for a certain field of work) is associated with the risk of job turnover (Edwards and Shipp 2012; Kristof-Brown et al. 2005). Compromises in the field of work may result in a reduced fulfillment of individuals' needs, as they may, for instance, be less interested in their daily occupational tasks. In support of these assumptions, research reveals that attaining a VET position congruent with one's interests for a specific domain predicts the intention to complete the VET program (Findeisen et al. 2022) or to drop out from VET (Ahrens et al. 2021; Fischer-Browne et al. 2024; Holtmann and Solga 2023). Adolescents with a migration background are not only more likely to enter VET positions with a different social status than expected, but they are also more likely to attain a VET position in a field of work that does not match their prior occupational interests (Eberhard and Christ 2019). Among other reasons, this may be because immigrants are less likely than their native peers to obtain the training position they apply for (Nennstiel 2022). Therefore, we assume that immigrants are more likely to experience career compromises in the field of work when entering VET than natives. Moreover, we assume that eventual career compromises in the field of work are an explanation of why immigrants are more likely to drop out of VET compared to their native peers.

H2a Immigrants are more likely of experiencing career compromises in the field of work when entering a first VET position compared to natives.

H2b Compromises between adolescents' occupational aspirations and their first VET occupation in terms of the field of work are associated with the probability of dropping out from VET.

H2c The increased probability of adolescents with a migration background to drop out from their first VET position can be partly attributed to higher career compromises in the field of work they face when entering their first VET position.

Taken together, our study is based on the assumption that, due to a number of constraints during the transition to VET, adolescents with a migration background are more likely than natives to face career compromises and, thus, to drop out of VET. These career compromises may be related to social career compromises when adolescents with a migration background obtain VET positions with a lower social status than expected or to compromises in the field of work when adolescents with a migration background obtain VET positions in a domain other than expected. So far, there is mixed evidence with regard to the relative importance of the different types of career compromises (Ahrens et al. 2021; Beckmann et al. 2023; Heckhausen and Tomasik 2002; Volodina et al. 2015). Beckmann et al. (2023) reported that social career compromises are crucial for individuals' VET dropout behavior. In contrast, Ahrens et al. (2021) as well as Fischer-Browne et al. (2024) found that career compromises in a certain field of work have the strongest association with individuals' successful completion of VET, while social career compromises are unrelated to individuals' VET dropout. However, from the perspective of Gottfredson's theory (1981), social career compromises are considered to be more serious than career compromises in the field of work as individuals tend to sacrifice their interests for a certain field of work to maintain their desired social status. Given these mixed empirical findings, we refrain from making hypotheses regarding the relative importance of social career compromises and compromises in the field of work.

Data and methods

Data and analysis samples

We used data from the Starting Cohort 4 (SC4, Grade 9) of the German National Educational Panel Study (NEPS; NEPS Network 2021; Blossfeld and Roßbach 2019).³ This stratified random sample was especially suitable for our empirical analyses as it provides in-depth and longitudinal information on young peoples' occupational aspirations as well as their pathways from Grade 9 in secondary school to the VET system and their subsequent trajectories. Hence, this cohort allows to observe the incidence of career compromises at the entry to VET programs and to account for relevant determinants (e.g., individuals' school biography). In addition, SC4 comprises a large and representative sample of ninth graders in German secondary schools. In NEPS, the first survey of SC4 was conducted in the ninth grade with a total sample of 16,425 students in autumn 2010 (Wave 1) and was carried out in classrooms using paper-and-pencil interviews

³ The NEPS study is conducted under the supervision of the German Federal Commissioner for Data Protection and Freedom of Information (BfDI) and in coordination with the German Standing Conference of the Ministers of Education and Cultural Affairs (KMK) and – in the case of surveys at schools – the Educational Ministries of the respective Federal States. All data collection procedures, instruments and documents were checked by the data protection unit of the Leibniz Institute for Educational Trajectories (LifBi). The necessary steps are taken to protect participants' confidentiality according to national and international regulations of data security. Participation in the NEPS study is voluntary and based on the informed consent of participants. This consent to participate in the NEPS study can be revoked at any time.

(PAPI). A second survey (Wave 2) was carried out in spring 2011. After Grade 9, surveys took place annually in the classroom via PAPI (Waves 3–8). After respondents had left the secondary school system, interviews took place twice a year (Waves 3–13) using computer-assisted telephone interviewing (CAPI). Our study used data from various survey waves (see Table 1) as it captured information collected during respondents' school biography, transition to a first VET program, and eventual completion or dropout from that program.

The analytical sample comprised respondents who had started a first (company- or school-based) VET program after leaving secondary school at the end of Grade 9, 10 or later. Thus, our analytical sample consisted of different school-leaver cohorts: 30% left secondary school after Grade 9, 48% after Grade 10, and 22% after Grade 12 or 13. Following recent research (Holtmann and Solga 2023), we further restricted the sample and only included trainees who were observed until they completed their VET program or for a minimum of 12 months after they dropped out of their VET program. This sample restriction enabled us to observe eventual entries into a new VET program in the next VET year and, thus, to distinguish dropouts from stop-outs (i.e., students who begin another VET program after the termination of the first VET program; Holtmann and Solga 2023; Wydra-Somaggio 2021). The final analysis sample consisted of $n=4,004$ trainees who entered VET largely between 2011 and 2016. Respondents were on average 18 years old ($SD=1.6$) when they entered their first VET program. Table 1 gives an overview of the operationalization of the variables, Table 2 shows the descriptive statistics of the analytical sample.

Dependent variable

The dependent variable captured dropouts from individuals' first VET position on a monthly basis. Following previous research on dropouts in VET (e.g., Holtmann and Solga 2023; Krötz 2024; Krötz and Deutscher 2022), the dependent variable differentiated between successful VET completion and dropouts, while we excluded respondents with occupational or company stop-outs ($n=568$). Trainees who participated in their VET program until the end but did not pass the final exam were also considered dropouts ($n=60$).

Independent variables

We defined adolescents with a migration background as individuals who were born in Germany and have at least one parent who was born outside of Germany. Data on respondents' migration background was surveyed in Grade 9 (wave 1, fall 2010).

Following previous research (Beckmann et al. 2023; Fischer-Browne et al. 2024), career compromises were measured by comparing adolescents' realistic occupational aspiration from their school days with their first VET occupation they attained after leaving the secondary school system. Given the different school-leaver cohorts in our sample (e.g., students graduating after Grade 9, Grade 10 or Grade 12/13), occupational aspirations were measured at different time points depending on when respondents left secondary school. However, information on occupational aspirations was collected before entering the VET system for all respondents. Taken together, the different types of career compromises were constructed based on the discrepancy between (1) students' realistic occupational aspirations measured before entering the VET system and (2) the

Table 1 Overview of the independent variables

Construct	Measurement	Coding for our analysis	Time of measurement
Socio-demographic factors			
Gender	Gender categories	0 = male, 1 = female	Grade 9 (wave 1)
Migration background	Student and/or at least one parent not born in Germany	0 = no, 1 = yes	Grade 9 (wave 1)
Social origin	Parents' highest International Socio-Economic Index of Occupational Status (ISEI-08; Ganzeboom 2010)	Range: 16 to 90	Grade 9 (wave 1)
Career compromises			
Compromises in the field of work	Discrepancies on the occupational level (using German Classification of Occupations, Paulus and Matthes 2013; Matthes et al. 2015) between expected and attained VET positions.	0 = no compromise, 1 = low compromise, 2 = moderate compromise, 3 = strong compromise	At beginning of first VET position (different waves)
Social career compromises	Discrepancies between trainees' obtained VET position and their occupational aspirations, both measured by the International Socio-Economic Index of Occupational Status (ISEI-08; Ganzeboom 2010).	0 = no compromise, 1 = upward discrepancy, 2 = downward compromise	At beginning of first VET position (different waves)
Prior school achievement			
Upper secondary school certificate	Highest school-leaving certificate before first VET position	0 = no, basic or intermediate secondary certificate, 1 = upper secondary certificate	Before first VET position (different waves)
Grade point average (GPA)	GPA on school-leaving certificate held at the beginning of first VET position	Range: 1 = very good to 6 = insufficient	At beginning of first VET position (different waves)
Linguistic skills			
Receptive vocabulary	Peabody Picture Vocabulary Tests (PPVT) (Dunn and Dunn 2004)	Range: 0 to 87	Grade 9 (wave 1), if missing wave 2
Socioemotional skills			
Tenacious goal pursuit	Tenacious Goal Pursuit Scale (Brandstädter and Renner 1990) including 5 items that refer to how respondents handle situations where wishes, goals or plans might not be realized the way respondents would like to, e.g.: "The more difficult it is to reach a goal, the more I think it's worth doing" (NEPS 2016, p. 327).	Scale: 1 = "does not apply at all" to 5 = "applies completely" Sum score, range: 1–5 $\alpha = 0.7$	End of grade 10 (wave 3)
Global self-esteem	German version of Rosenberg's general self-esteem scale (von Collani and Herberg 2003) including 11 items that respondents' agreement with different statements related to their self-esteem, e.g.: "All in all, I am satisfied with myself" (for details, see NEPS 2013, p. 7).	Scale: 1 = "not at all" to 5 "totally"; sum score of all items, range: 1–50, $\alpha = 0.85$	Grade 9 (wave 1)
Regional VET market			

Table 1 (continued)

Construct	Measurement	Coding for our analysis	Time of measurement
Supply-demand ratio (SDR) for training positions	Ratio of dual training opportunities offered (concluded training contracts plus vacant training places) and dual training opportunities requested (concluded training contracts plus vacant youths with intentions of obtaining training contracts) in a given training year	Range: 73.9–128.8	At time of leaving secondary school (different waves)
Other controls			
Born abroad	Student born abroad	0 = no, 1 = yes	Grade 9 (wave 1)
Distance between aspiration and VET entry (months)	Distance (in months) between the measurement of respondents' aspirations and the start date of the respective VET program	Range: 1–44	At beginning of first VET position (different waves)

Table 2 Descriptive statistics

	Percent	M	SD	Min	Max	N (valid)	Missing in %
Dependent variable							0.0%
Completed first VET position (ref.)	87.3%			0	1	3,496	
Dropout from first VET position	12.7%			0	1	508	
Migration background							1.1%
No (ref.)	79.0%			0	1	3,129	
Yes	21.0%			0	1	830	
Compromises in the field of work							23.0%
No compromise (ref.)	43.4%			0	1	1,351	
Weak compromise	12.8%			0	1	392	
Moderate compromise	15.0%			0	1	462	
Strong compromise	28.8%			0	1	879	
Social career compromises							15.6%
No compromise (ref.)	51.2%			0	1	1,846	
Upward discrepancy	13.7%			0	1	412	
Downward compromise	35.1%			0	1	1,120	
Social background							
Parents' HISEI		48.0	18.9	11.6	88.9	3,889	2.9%
Prior school achievement							2.0%
School-leaving certificate							
No or lower secondary school certificate (ref.)	78.5%			0	1	3,074	
Upper secondary school certificate	21.5%			0	1	849	
GPA on school certificate		2.7	0.6	1	6	3,576	5.3%
Language skills							
Receptive vocabulary		55.1	10.4	7	87	3,824	4.5%
Controls							
Gender							0.5%
Male (ref.)	53.1%			0	1	2,115	
Female	46.9%			0	1	1,870	
Tenacious goal pursuit		3.6	0.6	1	5	2,764	31.0%
Global self-esteem		38.8	6.4	10	50	3,341	16.6%
SDR for training positions		93.2	6.9	73.9	128.8	3,914	2.3%
Born abroad	5.1%			0	1	202	1.0%
Distance between aspiration and VET entry		7.3	4.9	1	44	4,004	0.0%

Data: GPA=grade point average; HISEI=highest socio-economic index of occupational status; SDR=supply-demand ratio for training positions. *N*(valid) refers to the total number of respondents with valid information. NEPS SC4 SUF 13.0.0, column percentages or means of imputed data ($m=30$), own calculations

attained VET position (see Beckmann et al. 2023). (1) Realistic occupational aspirations (also called occupational expectations; e.g., Rehberg 1967; Rojewski 2005) pertain to the specific occupations that adolescents expect to attain in the future while taking into account their perceived opportunities, individual resources and external constraints (Heckhausen and Tomasik 2002; Rehberg 1967). In line with the before mentioned definition, NEPS measured realistic occupational aspirations with the following open-ended question: “Considering everything you know now: what occupation will you actually pursue in the future?” (NEPS 2013, p. 91). In this respect, it is also important to point out that before assessing realistic occupational aspirations, respondents in NEPS were asked to state which occupation they desire ideally regardless of their current situation.⁴ We utilized the latest information available on realistic occupational aspirations before

⁴ The question that precedes the measurement of realistic aspirations in the questionnaire surveys the idealistic aspirations: “Regardless of your current situation, what [occupation] would you most like to [take up] in the future?” (NEPS 2019, p. 907).

respondents left the secondary school system. (2) The measurement of the attained VET occupation was assessed with the following open-ended question: *“In which [occupation] have you been doing this vocational training / are you doing the vocational training right now? Please specify the exact name, for instance how it is stated in your training contract”* (NEPS 2019, p. 132). The open-ended responses were then classified into standard occupational classification schemes.

To test H1a-H1c, social status compromises were captured based on the International Socio-Economic Index of Occupational Status (ISEI-08; Ganzeboom 2010). The ISEI measures values between 16 and 90 (Ganzeboom et al. 1992). Following Beckmann et al. (2023), the variable for social status compromises refers to the difference between trainees' obtained VET position and their initially anticipated realistic occupational aspirations, both measured by the ISEI. A value of 0 denotes no compromise, positive values indicate upward compromises, indicating that trainees find themselves in occupations with a higher social status than aspired, while negative values denote downward compromises, indicating that trainees find themselves in occupations with a lower social status than expected. Following previous research (e.g., Nießen et al. 2023), we computed a nominal variable assigning students to one of three groups based on the continuous difference score ($M = -6.7$; $SD = 17.3$): (a) a reference group who experienced no or only minor social status discrepancies (difference score within the threshold of $|5|$), (b) trainees with a downward social status compromise (difference score < -5), and (c) trainees with an upward social status discrepancy (difference score $> +5$).

To investigate H2a-H2c, we followed Beckmann et al. (2023) and operationalized career compromises in the field of work based on the German Classification of Occupations (KldB 2010; Paulus and Matthes 2013).⁵ This classification categorizes occupations based on two dimensions (Paulus and Matthes 2013): (1) occupational specialization (i.e., skills, abilities, and knowledge related to occupations) and occupational requirements (i.e., the degree of complexity of an occupation). Following Beckmann et al. (2023), we distinguished occupational sectors and segments (Matthes et al. 2015). Occupational sectors and segments group together occupations with varying degrees of similarity in terms of vocational tasks, competencies, and required knowledge (Paulus and Matthes 2013). In accordance with Beckmann et al. (2023), we identified four distinct types of field-of-work compromises based on the occupational level at which discrepancies between aspired and attained VET positions occur: (1) no compromise, where there was no difference at the most specific level of “occupational sub-groups” (the baseline category), (2) weak compromise, involving differences at the level of “main occupational groups,” (3) moderate compromise, characterized by differences at the level of “occupational segments,” and (4) strong compromise, indicating differences at the level of “occupational sectors.”⁶

⁵ The German Classification of Occupations contrasts with other occupation classification schemes, such as the RIA-SEC classification, which generally stems from the mean interest ratings of individuals in various occupations. “As such, the RIASEC classification appears likely to overestimate the relationships between occupational choices and vocational interests, and possibly to underestimate their relationships with other constructs” (Volodina and Nagy 2016, p. 65).

⁶ The German Classification of Occupations is structured as a hierarchical classification with different levels. The lower the level is, the greater is the similarity among the occupations. The similarity is “determined by how strongly the skills, abilities and knowledge required for an occupation coincide in two occupations” (Paulus and Matthes 2013, p. 7). At the most specific level used in this paper, the classification distinguishes 700 occupational sub-groups, which at higher levels of the hierarchical classification are categorized in 144 occupational groups and 37 main occupational

As outlined in our theoretical framework, when investigating immigrants' VET dropout rates, the selective opportunities to enter VET programs need to be considered (see also Holtmann and Solga 2023). Therefore, we added indicators of respondents' social background and prior school achievement as additional mediators. To account for respondents' socio-economic background, parents' highest ISEI-08 (Ganzeboom 2010) was used. Respondents' school achievement was measured using a selection of indicators to avoid overfitting. We included respondents' highest school-leaving certificate, distinguishing between upper secondary school certificates (*Fachhochschulreife* or *Abitur*) and intermediate or basic secondary school certificates (*Hauptschulabschluss* or *Realschulabschluss*, the reference category). In addition, we included the grade point average (GPA) on the school-leaving certificate. Linguistic skills, tested in grade 9, were used because they are an important predictor of migration-related VET dropout (Böhn and Deutscher 2022). Linguistic skills in German were measured by respondents' receptive vocabulary, which is an internationally compatible indicator of the acquired linguistic skills and abilities of young people (LifBi 2011).⁷ The test of receptive vocabulary was based on a modified version of the Peabody Picture Vocabulary Test (Dunn and Dunn 2004).

Control variables

Given the relevance of socioemotional skills in the context of VET dropouts (see Chap. 3), we included measures of tenacious goal pursuit (Brandstädter and Renner 1990) and global self-esteem (von Collani and Herzberg 2003) as control variables. Moreover, we controlled for gender (coded as 0=male, 1=female) as women are more likely to experience social status compromises than men due to higher occupational aspirations in terms of social status (Nießen et al. 2022). In addition, we accounted for the supply–demand ratio (SDR) for company-based training positions at the labor market district level, as the regional VET market may be responsible for systematic differences in occupational aspirations and opportunities (Glauser and Becker 2016; Michaelis and Busse 2021). The SDR for training positions indicates the ratio of training positions offered by the companies (concluded training contracts plus vacant training positions) and the training positions requested by the individuals (concluded training contracts plus vacant adolescents with intentions of obtaining training contracts) in a given training year (Federal Institute of Vocational Education and Training 2018). While values of the SDR above 100 indicate that the demand for training positions is lower than the number of training positions offered, values below 100 denote that the demand for training positions is higher than the training positions offered by the companies. In our sample, the SDR for training positions at the labor market district level ranged between 73.9 and 128.8 ($M=93.2$, $SD=6.9$). Finally, we used the time lag between the measurement of aspirations and the start date of the respective VET program to account for differences in the time at which students' occupational aspirations were measured.

groups. The 37 main occupational groups are then grouped into 14 “occupational segments” and five “occupational sectors” according to professional criteria (Matthes et al. 2015).

⁷ In Grade 9, NEPS also administered competence tests regarding respondents' reading comprehension. However, we did not utilize respondents' competence test scores regarding reading comprehension as receptive vocabulary showed a stronger correlation with VET dropout behavior (receptive vocabulary: $r=-0.15$, $p<0.001$; reading competence: $r=-0.12$, $p<0.001$) and migration background (receptive vocabulary: $r=-0.32$, $p<0.001$; reading competence: $r=-0.19$, $p<0.001$). In addition, both indicators showed a substantial correlation ($r=0.52$, $p<0.001$). We did not use both indicators to avoid multicollinearity and overcontrol bias.

The distance between the measurement of respondents' aspirations and the start date of the respective VET program varied between 1 months and 44 months ($M=7.3$; $SD=4.9$).

Continuous variables were z -standardized for all bivariate and multivariate analyses. Table 3 reports the correlations between the variables.

Analytical strategy

To investigate the association of migration background on VET dropout and to empirically test the assumed theoretical mechanisms, we utilized the following empirical approaches (all analyses were estimated in STATA 18).

1. To examine the relationship between migration background and the incidence of career compromises (H1a and H2a), we conducted bivariate group comparisons using a test of two proportions to perform tests on the equality of proportions (STATA command *prtest*). In addition, we calculated effect sizes for proportion differences (Cohen's h ; Cohen 1988) between natives and immigrants. Following Cohen's convention, effect sizes (for Cohen's h) with an absolute value of 0.2 can be interpreted as small, with an absolute value of 0.5 as medium, and with an absolute value of 0.8 as strong group differences.
2. We performed a logistic regression approach (Best and Wolf 2015) to investigate H1b and H2b, which allows the analysis of the non-linear association between our independent variables and the dichotomous outcome (i.e., dropout from VET). We reported average marginal effects (AME) to display the average effect of a migration background on the probability of dropping out from VET, given that all covariates are held constant at their values (STATA command *mimrgns*). AME are robust against scaling, they are superior to other coefficients (e.g., odds ratios) in many respects, and allow for comparability across logistic regression models (Best and Wolf 2015). We estimated three nested models: Model 1 shows the relationship between migration background and VET dropout without controls. Model 2 (our baseline model) indicates the relationship between migration background and the probability of dropping out from VET net of the controls (i.e., gender, goal orientation, self-esteem, regional SDR for training positions and the distance between the interview on aspirations and VET entry), while Model 3 added the mediators for social background, school achievement, language skills, and career compromises.
3. To investigate the extent to which the association between migration background and VET dropout is explained by the measures of career compromises (H1c and H2c), we performed decomposition analyses by employing the KHB method (STATA command *khb*) (Breen et al. 2013; Karlson et al. 2012; Kohler et al. 2011). The KHB method facilitates the correct estimation of direct and indirect effects in logistic mediation models through rescaling coefficients (Breen et al. 2013) and enables to quantify the net contribution of our main mediators – the measures of career compromises – in explaining associations between migration background and VET dropout. As we expected that a substantial part of the association between migration background and VET dropout was explained by social background, school achievement, and language skills, the results of the KHB decomposition quantified the extent of the contribution of our main mediator – career compromises – relative to the other mediators. For this purpose, the KHB method disentangles the total, direct and indirect association

Table 3 Pairwise correlation matrix (Pearson correlation)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Dropout from first VET position	0.10															
2. Migration background	-0.13	-0.10														
3. No compromise in the field of work	0.02	0.03	-0.33													
4. Weak compromise in the field of work	0.03	0.03	-0.37	-0.16												
5. Moderate compromise in the field of work	0.10	0.07	-0.56	-0.24	-0.27											
6. Strong compromise in the field of work	0.07	0.02	-0.21	0.05	0.09	0.19										
7. Upward social career discrepancy	0.01	0.04	-0.45	0.11	0.16	0.42	-0.29									
8. Downward social career compromise	0.02	0.04	0.02	-0.01	0.03	0.02	0.01	0.04								
9. Gender: female	-0.13	-0.23	-0.05	0.03	-0.00	0.05	-0.03	0.10	-0.02							
10. Parents' HISEI	-0.14	-0.08	-0.19	0.03	0.05	0.18	-0.01	0.22	0.10	0.26						
11. Upper secondary school certificate	0.13	0.09	-0.11	-0.03	0.04	0.14	0.05	0.01	-0.09	-0.08	-0.02					
12. GPA on school certificate	-0.15	-0.32	-0.02	0.01	0.03	-0.02	-0.04	0.11	-0.18	0.28	0.31	-0.16				
13. Receptive vocabulary	0.02	0.05	-0.01	-0.02	0.01	-0.01	-0.02	0.02	-0.03	-0.03	-0.02	-0.11	-0.03			
14. Tenacious goal pursuit	-0.08	-0.01	0.03	-0.00	-0.03	-0.03	-0.01	0.01	-0.20	0.06	0.06	-0.08	0.10	0.24		
15. Global self-esteem	-0.05	-0.05	0.07	-0.02	-0.04	-0.06	0.00	-0.03	-0.01	0.00	-0.12	-0.10	0.03	-0.02	0.00	
16. SDR for training positions	-0.01	-0.00	-0.15	0.04	0.03	0.14	0.04	0.13	0.07	0.12	0.32	-0.01	0.07	-0.01	-0.01	-0.12
17. Distance between aspiration and VET entry																

Notes: Average estimates pooled over 30 imputed data sets. Level of significance (two-sided tests); bold coefficients indicate significant correlations ($p < 0.05$). Data: NEPS SC4 SUF 13.0.0, own calculations

between migration background and VET dropout.⁸ While the baseline model (Model 2) represents the total association (also called ‘total effect’) between migration background and VET dropout net of controls, the full model reports the association between migration background on VET dropout remaining net of mediators (‘direct effect’). The difference in the estimated regression coefficients between the baseline and the full model reflects the indirect association (‘indirect effect’) between migration background and VET dropout through the mediators and controls. The ratio between the estimated regression coefficients of the baseline and the full model equals the overall confounding by all mediators. The KHB method enabled to quantify the amount of the association between migration background and VET dropout that is explained by each mediator variable in percentage points (percent mediated). To quantify the uncertainty around these indicators, we applied bootstrapping following the routine proposed by Little and Rubin (2019). In the [results](#) section, we present bootstrapped standard errors of the indirect effects and the mediation percentages. We used 30 imputed datasets and 500 replications to calculate the bootstrapped standard errors.

Missing information on independent variables were estimated using Multivariate Imputation by Chained Equations (MICE, see: Azur et al. 2011). In line with the recommendations of simulation and validation studies (von Hippel 2007), both the dependent and independent variables were included in the imputation model. To increase the robustness of imputations, 30 imputed data sets were generated.

Results

Career compromises and migration background

Regarding the hypotheses H1a and H2a, our findings revealed substantial differences between immigrants and natives in terms of career compromises (see Table 4). Immigrants were more likely to have unmet career aspirations than natives. With regard to compromises in the field of work (H1a), our findings revealed that immigrants (34%) were 12 percentage points less likely to have no compromise in the field of work compared to natives (46%). This gap was significant, but the effect size was small (Cohens $h = -0.25$; $p < 0.001$). In addition, trainees with a migration background (35%) were significantly more likely to experience strong compromises in the field of work than natives (27%; Cohens $h = 0.16$; $p < 0.01$). Regarding social career compromises (H2a), differences between immigrants and natives were less pronounced, yet significant. Compared to natives (53%), immigrants (46%) were significantly less likely to experience no social career compromise (Cohens $h = -0.14$; $p = 0.001$) and they were significantly more likely to attain a VET position with a lower social status than expected (39% vs. 34%), i.e., downward social career compromises (Cohens $h = 0.10$; $p = 0.017$). However, the effect sizes were rather small.

VET dropout and migration background

To test our research hypotheses regarding the importance of career compromises in explaining adolescents’ probability of dropping out from VET (H1b and H2b) and the

⁸ Originally, Kohler et al. (2011) refer to total, direct, and indirect effects, when describing the KHB method. However, in the context of our article, we prefer to speak of associations not effects, as the latter induce a causal interpretation.

Table 4 Gaps in career compromises between immigrants and natives

	Natives	Immigrants	Test of proportions ¹		Cohen's <i>h</i>
			Mean Difference	SE of Difference	
Compromise in the field of work					
No compromise	46.0%	33.6%	-12.4***	1.9	-0.25
Weak compromise	12.3%	14.4%	2.1	1.3	0.06
Moderate compromise	14.4%	17.1%	2.7	1.4	0.07
Strong compromise	27.2%	34.8%	7.6**	1.8	0.16
Social career compromise					
No compromise	52.7%	45.7%	-7.0**	1.9	-0.14
Upward discrepancy	13.2%	15.2%	2.0	1.4	0.06
Downward compromise	34.1%	39.1%	5.0*	1.9	0.10

Notes. ¹ Estimated difference of proportions (percentage points) based on two-sample tests of proportions. Average estimates pooled over 30 imputed data sets. Reference category for all tests were native respondents. Level of significance (two-sided tests): *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Data: NEPS SC4 SUF 13.0.0, own calculations ($N=4,004$)

Table 5 Logistic regression model of trainees' VET dropout behavior (KHB corrected)

	Model 1		Model 2		Model 3	
	AME	(SE)	AME	(SE)	AME	(SE)
Migration background (ref.: natives)	0.069***	(0.011)	0.053***	(0.013)	-0.000	(0.014)
Social background						
Parents' HISEI					-0.023***	(0.006)
Prior school achievement						
Upper secondary school certificate (ref.: basic or intermediate secondary school certificate)					-0.112***	(0.010)
GPA on school certificate					0.029***	(0.006)
Language skills						
Receptive vocabulary					-0.017**	(0.006)
Social career compromise (ref.: no compromise)						
Upward discrepancy					0.026	(0.019)
Downward compromise					0.001	(0.015)
Career compromise in the field of work (ref.: no compromise)						
Weak compromise					0.065**	(0.020)
Moderate compromise					0.069***	(0.019)
Strong compromise					0.103***	(0.018)
Controls						
Female (ref.: male)			0.002	(0.011)	0.009	(0.011)
Born abroad			0.054*	(0.021)	0.038	(0.021)
Global self-esteem			-0.027***	(0.006)	-0.018**	(0.006)
Tenacious goal orientation			0.013	(0.007)	0.014*	(0.007)
SDR for training positions			-0.016**	(0.006)	-0.016**	(0.006)
Distance between aspiration and VET entry			-0.001	(0.001)	0.001	(0.001)
Observations		4,004		4,004		4,004

Notes: Average marginal effects (AME) with standard errors in parentheses. Logistic regression models with imputed data (30 imputed data sets). GPA=grade point average; HISEI=highest socio-economic index of occupational status; SDR=supply-demand ratio for training positions. Level of significance (two-sided tests): *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Data: NEPS SC4 SUF 13.0.0, own calculations

association between migration background and VET dropout (H1c and H2c), we first present the results of the logistic regression models (see Table 5). In Model 1 the raw influence of migration background on VET dropout without accounting for controls was estimated, while the baseline model (Model 2) estimated the association between migration background and VET dropout behavior net of the controls. In Model 3, the full model, we included our mediator variables.

Model 1 showed a significant and positive relationship between migration background and the probability of dropping out from VET ($AME=0.069$; $p<0.001$). Adolescents with a migration background were 6.9 percentage points more likely of dropping out from VET. After accounting for the controls (Model 2), the association between migration background and VET dropout decreased ($AME=0.056$) but was still significant ($p<0.001$). After adding the mediators to the logistic regression (Model 3), the direct relationship between migration background and VET dropout was no longer statistically significant ($p=0.991$).

The results further showed that the associations between independent variables and our outcome of interest, VET dropout, were as expected (see Model 3 in Table 5), thereby supporting – in part – our theoretical arguments: Both a higher parental highest ISEI ($p<0.001$) as well as a higher school achievement in terms of grade point average ($p<0.001$) or school-leaving certificate ($p<0.001$) were associated with a lower probability of dropping out from VET, while a higher competition for company-based VET programs among adolescents was associated with a higher probability of VET dropout ($p=0.003$). We also found that a higher receptive vocabulary was associated with a lower probability of VET dropout ($p=0.005$). However, and contrary to what we had assumed in H1b, neither downward social career discrepancies ($p=0.981$) nor upward social career discrepancies ($p=0.159$) showed a significant relationship with the probability to dropout from VET. In contrast and supporting our expectations in H2b, career compromises in the field of work were strongly associated with VET dropout: Adolescents with weak ($AME=0.065$, $p=0.001$), moderate ($AME=0.069$, $p<0.001$) or strong compromises in the field of work ($AME=0.103$, $p<0.001$) were significantly more likely to drop out from VET compared to adolescents with no compromises. Our results thus indicate that compromises in the field of work were more important than social compromises in explaining dropout from VET.

In the final step, we present the results of the KHB decomposition, which estimates the indirect association between migration background and VET dropout and decomposes the unique association of our main mediators, net of the other controls (see Table 6). This enables us to quantify the extent to which gaps between immigrants and natives in VET dropout are ascribed to migration-specific career compromises. The results of the KHB analysis are reported in the last two columns of Table 6. The results displayed in the column labelled “Percent mediated” show how much of the total association of migration background on VET dropout is due to confounding of the respective mediator.

The results of the KHB analysis showed that there is a significant indirect relationship between trainees’ migration background and VET dropout ($AME=0.053$, $p<0.001$) through our mediator variables (see Table 6). In addition, migration background had a significant indirect association with trainees’ VET dropout through all mediators except for social career compromises and receptive vocabulary. Among compromises in the field of work, strong compromises significantly mediated the relationship between migration background and VET dropout ($AME=0.006$, $p<0.05$).

Overall, 100% of the total association between migration background and VET dropout was due to the mediator variables (see Table 6). In other words, social background, prior school achievement, language skills, and career compromises explained 100% of why adolescents with a migration background were more likely to dropout from VET compared to their native peers. Table 6 further allowed us to quantify and compare the

Table 6 Indirect association and percentage mediated of migration background on VET dropout (KHB analysis)

	AME (SE)	Percent mediated (SE)
Indirect effect of migration background	0.053*** (0.013)	
Via parents' HISEI	0.012*** (0.003)	22.4% (11.2)
Via upper secondary school certificate (ref.: basic or intermediate secondary school certificate)	0.012*** (0.003)	22.8% (9.7)
Via GPA on school certificate	0.007** (0.002)	12.6% (5.5)
Via receptive vocabulary	0.011** (0.004)	21.4% (12.6)
Via social career compromises (ref.: no compromise)		-0.4% (2.8)
Upward discrepancy	0.000 (0.000)	
Downward compromise	-0.000 (0.000)	
Via career compromises in the field of work (ref.: no compromise)		21.6% (9.1)
Weak compromise	0.002 (0.001)	
Moderate compromise	0.003 (0.002)	
Strong compromise	0.006* (0.002)	
Sum of percent mediated		100.4% (38.8)
Observations		4,004

Notes: KHB method with imputed data (30 data sets) and bootstrapped standard errors in parentheses (492 replications). Estimates adjusted for the controls in Model 3 (see Table 5). The column labelled 'Percent mediated' shows how much the total association of migration background on VET dropout is due to confounding of the respective mediator. Percentages may not add up due to rounding errors. Level of significance (two-sided tests): *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Data: NEPS SC4 SUF 13.0.0, own calculations ($N=4,004$)

relative importance of the different types of career compromises in explaining higher VET dropout rates among adolescents with a migration background compared to that of natives. While social career compromises were statistically irrelevant for the association between migration background and VET dropout, immigrants' higher compromises in the field of work accounted for 22% of immigrants' higher dropout rates. Compared to the other confounders, career compromises in the field of work explained immigrants' higher probability of dropping out of VET to a similar extent as the indicators of social background (22%) or the measures of school achievement (GPA: 12%; school-leaving certificate: 23%). The mediation percentages of the measures for career compromises in the field of work, social background (i.e., parents' HISEI) and school achievement (GPA and school-leaving certificate) were statistically significant at conventional significance levels. In contrast, the mediation percentages of social career compromises and language skills were statistically not significant.⁹

Discussion and conclusion

Summary

Dropping out of vocational education and training (VET) often has a negative impact on further participation in education and training, on the transition to skilled employment and on career progression (Patzina and Wydra-Somaggio 2020). Trainees with a migration background face a substantially higher dropout risk in VET than their native peers (Böhn and Deutscher 2022; Michaelis and Richter 2022). The aim of this paper was to examine the empirical importance of career compromises in explaining differences in the risk of dropping out of a first VET position between trainees with and without migration background. For this purpose, we extended the current state of research and

⁹ In line with Breen et al. (2021), the mediation percentage is considered significant at least at the 5% level when the ratio of the point estimate (percent mediated) and standard error is higher than the absolute value of 2 (see Table 6).

focused on two types of compromises that adolescents may face when opting for VET programs: compromises related to social status and compromises related to the field of work. Since adolescents with a migration background face greater difficulties than their native peers in the process of choosing and finding an apprenticeship, we assumed that they are particularly vulnerable for both types of career compromises. Our results revealed that adolescents with a migration background are more likely to experience career compromises in the field of work and social career compromises than their native peers, which is in line with our theoretical assumptions addressed in hypotheses H1a and H2a. Consistent with the results of previous studies (Michaelis and Richter 2022; Rohrbach-Schmidt and Uhly 2015), our results further showed that adolescents with a migration background are substantially more likely of dropping out from their first VET position compared to natives. In addition, our results underlined the importance of career compromises in the field of work for adolescents VET dropout behavior, which is also consistent with findings from previous research (e.g., Ahrens et al. 2021). While our findings yielded no support for the influence of social career compromises on trainees' probability of dropping out from VET (H1b), career compromises in the field of work were substantially associated with trainees' probability to drop out from VET, thereby supporting H2b. The relevance of finding a VET position that is congruent with one's interests for a specific field of work for later career outcomes is also reflected in previous research (Ahrens et al. 2021; Findeisen et al. 2022; Fischer-Browne et al. 2024; Holtmann and Solga 2023; Volodina and Nagy 2016).

As an extension to the current state of research, the present study simultaneously assessed and quantified the degree to which the migration background gap in VET dropout is explained by differences in career compromises while accounting for other important mediators (e.g., social background, school achievement, and language skills) and controls (e.g., socioemotional skills). Based on our theoretical reasoning, we expected that both social career compromises (H1c) as well as compromises in the field of work (H2c) would contribute to the higher probability of adolescents with migration background to drop out from VET. However, the results only yielded support for H2c as career compromises in the field of work (i.e., the discrepancy between expected and attained VET positions at the occupational level) were a significant mediator for the association between migration background and VET dropout behavior and explained 22% of the higher probability of adolescents with a migration background to drop out of their first VET position even when accounting for social background, school achievement, language skills, and other controls. In contrast, the indicator of social career compromises did not account for migration background gaps in VET dropout rates. In other words, a higher probability of unmet interests regarding domain-specific characteristics (e.g., the most salient activities and task characteristics of the desired occupation) contribute to gaps in VET dropout rates between adolescents with and without a migration background, while social career compromises are statistically insignificant. Taken together, the higher VET dropout rate among adolescents with a migration background partly reflects a higher mismatch between the fields of work they are interested in and the occupations they are able to attain within the VET system. Stated in terms of the person-environment fit theory (Edward and Shipp 2012), adolescents with a migration background are less likely than their peers without a migration background to enter VET

occupations that align with their occupational interests, making them more prone to dropping out.

Social career compromises among adolescents with a migration background did not contribute to explaining gaps in VET dropout rates. We assume that the empirical irrelevance of social career compromises to the higher likelihood of adolescents with a migration background to drop out of their first VET is related to three aspects. *First*, gaps in social career compromises between adolescents with and without a migration background are rather small. We expected that adolescents with a migration background are more likely to be exposed to social career compromises in the German VET system as they exhibit higher occupational aspirations in terms of the social status than natives (e.g., Beicht and Walden 2019). In addition, there are only a few occupations that allow for the realization of high occupational aspirations (Schels et al. 2022). *Second*, Schels and Abraham (2023) indicated that, at the beginning of the application process for VET positions, VET applicants largely assess their VET opportunities reasonably well from the outset of the application process, so that downgrading of desired occupations is often not necessary. This is because adjustments in social career aspirations occur before the application process begins, as students' selection into school tracks strongly influences how students assess their chances on the VET market (Schels and Abraham 2023). *Third*, we assume that the low relevance of social career compromises in the context of VET dropouts among adolescents with a migration background may be related to the fundamental decision towards the end of general schooling—whether to enter academic school tracks in order to be able to enroll in university studies or to switch to VET programs. Schels and Abraham (2023) found that applicants who cannot enter a VET position in their preferred occupation stay in general school. We assume that this phenomenon is more pronounced for applicants with a migration background, as a large body of research indicates that immigrants are more likely to prefer academic tracks over vocational alternatives at the upper-secondary level when controlling for social background and achievement (Busse et al. 2023; Busse and Scharenberg 2022; Glauser and Becker 2023; Jonsson and Rudolphi 2011; Kilpi-Jakonen 2011; Tjaden and Scharenberg 2017).

Limitations

The present study has several limitations. *First*, our study cannot capture the dynamic process of the development of occupational aspirations and choices, as it focuses on a preliminary endpoint of the compromise process, at which point it becomes apparent whether or not adolescents have realized their occupational aspirations. In NEPS, students were interviewed relatively late in the process of occupational choice when they “had already started to develop accessible and achievable occupational goals” (Schels et al. 2022, p. 164). Yet, adolescents' perception regarding the accessibility of their desired occupation was not included in our analyses as it was not part of the NEPS survey. Therefore, it remains unclear in this study whether adolescents' perception of accessibility differ depending on their migration background. In addition, given that processes of circumscription and compromise relevant to the formation of occupational aspirations evolve early during childhood and adolescence (Gottfredson 1981, 1996), important stages in the development of occupational choice remain unobserved in our study—that is, for example, how adolescents narrowed down their zone of acceptable alternatives

by eliminating unacceptable alternatives before their first interview in NEPS. As earlier stages of career compromises are in addition regarded to be more socially selective (e.g., Schels et al. 2022), future research needs to examine migration-related inequalities regarding the formation of occupational aspirations during childhood and adolescence.

Second, our study examines career compromises based on objective measures that relate to the discrepancy between occupational characteristics and individuals' occupational aspirations, whereas our study does not provide information on how individuals subjectively perceive career compromises in their occupational choices. Investigating how individuals experience career compromises in their decision-making process would enhance our understanding regarding the importance of unmet occupational aspirations in this vulnerable and important transition process for young people.

Third, at the stage of VET dropouts, other factors that we theoretically and empirically consider here may also be decisive for driving the higher probability of dropping out of VET among adolescents with a migration background. For example, from the perspective of person-environment fit theory (Kristof-Brown et al. 2005), the congruence of adolescents' skills and abilities with the requirements of the VET position (i.e., vocational skill congruence) is another plausible mechanism that may contribute to VET dropout (Michaelis and Findeisen 2022). Domain-specific skills, such as general and basal occupational key skills (e.g., numeracy and literacy), are important to cope with the demands in an occupation (Winther and Achtenhagen 2009). However, a lack of vocational skill congruence is barely responsible for terminations of VET contracts (Michaelis and Findeisen 2022). In addition, the NEPS did not provide information on the recruitment processes of companies. Therefore, we could not assess the extent to which employers' selection criteria and eventual discrimination processes affect career compromises and VET dropout among adolescents with a migration background. As discussed in our theoretical framework, given the well-documented discrimination against immigrants in hiring processes (Imdorf 2017; Nennstiel 2022; Neumark 2018; Schmaus and Kristen 2022; Zschirnt 2020; Zschirnt and Ruedin 2016), adolescents with a migration background may be more often forced to deal with stronger career compromises than their native peers. However, even if adolescents with migration background are capable to overcome the obstacles that come along with ethnic discrimination when entering VET, discriminatory practices are likely to be present in the workplace once they have entered VET. Del Triana et al. (2015) reveal that the perceived ethnic discrimination in the workplace is negatively associated with job attitudes as well as physical and psychological health and positively related to coping behavior. As the aforementioned aspects require different theoretical considerations and measures, they are beyond the scope of the present study.

Fourth, between 2011 and 2016, the focal years of our study, school leavers interested in VET faced a VET market characterized by constraints caused by a lack of available company-based VET positions. Although the ratio of supply and demand of company-based VET positions has become more balanced between 2011 and 2016, there was still a lack of VET positions. Consequently, between 2011 and 2016 approximately 80,000 applicants, on average, remained without a VET contract (Authoring Group Educational Reporting 2022; Seeber et al. 2019a). Currently, the German labor market is influenced by a socio-demographic change, which results in shortages of skilled workers in numerous domains and affects the VET market. Consequently, there is a reduced competition

for VET positions (Authoring Group Educational Reporting 2022). Although the ratio of supply and demand for company-based VET positions is currently almost at parity, the German VET market still faces mismatches, which have become even more pronounced in the last decade. Taking the year 2021 as the point of reference, there remained approximately 63,000 young applicants without a company-based VET position; simultaneously, the number of vacant company-based VET positions doubled from approximately 30,000 in 2011 to 63,000 in 2021 (Authoring Group Educational Reporting 2022, p. 172). National reports reveal that the increasing mismatches in the VET market are largely due to occupational mismatches—that is, the occupation-specific supply of VET positions does not match the occupation-specific demand for VET positions (Authoring Group Educational Reporting 2022; Seeber et al. 2019a). In other words, although there are sufficient VET positions and there are school leavers interested in VET, the VET market offers occupations in fields of work that school leavers tend to be less interested in. This makes compromises in the field of work even more likely despite the reduced competition for VET positions in the last few years. Further, regional comparisons indicate that immigrants and natives benefit equally from a lower competition in the VET market (Michaelis and Busse 2021). Nonetheless, it is unclear how the current changes in the VET market affect the interrelations among migration background, career compromises, and VET dropout rates.

Conclusion

Our study contributes to the existing research in three ways. *First*, to the best of our knowledge, our article is the first to investigate how career compromises are associated with higher VET dropout rates among adolescents with a migration background. *Second*, our study empirically quantifies and compares the extent to which career compromises contribute to the higher VET dropout rates among adolescents with a migration background. *Third*, in the light of the ongoing debate on occupational mismatches at the VET system, our contribution highlights the relevance of addressing career compromises in the field of work to reduce higher VET dropout rates among adolescents with a migration background. Regarding implications for practice, our findings provide insights into factors associated with migration-related differences in career compromises and dropout behavior. These insights may help to identify and establish strategies that enable adolescents in realizing their occupational aspirations, guide them in exploring and identifying alternative occupations that not only suit their occupational preferences but are also attainable, thereby partly reducing the incidence of career compromises and thus the eventual decision to drop out from VET (see also Beckmann et al. 2023). To reduce dropout rates among adolescents with a migration background, it would be desirable to strengthen career guidance and counselling in schools, as this is considered to be one important way of supporting young people in their decision-making process (e.g., Held 2015). This can help to mitigate the mismatch between individual interests, aspirations, skills and available training opportunities, thereby reducing compromises in the field of work and ultimately the number of dropouts from VET.

To develop more precise implications, future research needs to investigate the mechanisms that lead to career compromises among adolescents with a migration background. On the one hand, it involves to assess how inequalities in application and hiring processes (e.g., Imdorf 2017; Schmaus and Kristen 2022; Zschirnt 2020) lead to career

compromises among adolescents with a migration background. On the other hand, it may encompass to examine the extent to which adolescents with a migration background hold misaligned occupational aspirations (i.e., over- or underestimating the accessibility of desired occupations) (e.g., Ferrara and Salikutluk 2024), which may contribute to career compromises.

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Author contribution

RB conceived the aim of the study and coordinated the study. RB and DG were responsible for generating theory, hypothesis, methodology and discussion of the results. RB prepared the data, performed the statistical analysis and visualized the figures and tables. RB, DG and KS wrote, reviewed and edited the manuscript in several rounds. All authors read and approved the final manuscript.

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Data availability

The data that support the findings of this study are available from the Leibniz Institute for Educational Trajectories (LifBi) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available.

Declarations

Competing interests

The author declares that he has no competing interests.

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References

- Ahrens L, Fischer M, Kleinert C, Schels B (2021) Compromises in occupational choice and stability of vocational education and training. In: Nägele C, Stalder BE, Weich M (eds) Pathways in vocational education and training and lifelong learning. Proceedings of the 4th Crossing Boundaries Conference in Vocational Education and Training: Proceedings of the 4th Crossing Boundaries Conference in Vocational Education and Training, pp 24–31
- Authoring Group Educational Reporting (2020) Bildung in Deutschland 2020: Ein indikatorengestützter Bericht mit einer Analyse zu Bildung in einer digitalisierten Welt. W. Bertelsmann, Bielefeld
- Authoring Group Educational Reporting (2022) Bildung in Deutschland 2022: Ein indikatorengestützter Bericht mit einer Analyse zum Bildungspersonal. wbv Publikation, Bielefeld
- Azur MJ, Stuart EA, Frangakis C, Leaf PJ (2011) Multiple imputation by chained equations: what is it and how does it work? *Int J Methods Psychiatr Res* 20:40–49. <https://doi.org/10.1002/mpr.329>
- Becker B, Gresch C, Zimmermann T (2023) Are they still aiming high? The development of educational aspirations of lower secondary school students with immigrant backgrounds in Germany. *Int Migrat Rev* 57:1216–1248. <https://doi.org/10.1177/01979183221112404>
- Beckmann J, Wicht A, Siembab M (2023) Career compromises and dropout from Vocational Education and Training in Germany. *Soc Forces* 102:658–680. <https://doi.org/10.1093/sf/soad063>
- Beicht U, Walden G (2019) Who dares wins? Do higher realistic occupational aspirations improve the chances of migrants for access to dual vocational education and training in Germany? *J Educ Work* 32:115–134. <https://doi.org/10.1080/13639080.2019.1617840>
- Best H, Wolf C (2015) Logistic regression. In: Best H, Wolf C (eds) The SAGE handbook of regression analysis and causal inference. Sage, Los Angeles Calif. U.a., pp 153–172
- Birkelund JF (2020) Aiming high and missing the mark? Educational choice, dropout risk, and achievement in upper secondary education among children of immigrants in Denmark. *Eur Sociol Rev* 36:395–412. <https://doi.org/10.1093/esr/jcz064>
- Birkelund GE, Johannessen LEF, Rasmussen EB, Rogstad J (2020) Experience, stereotypes and discrimination. Employers' reflections on their hiring behavior. *Eur Soc* 22:503–524. <https://doi.org/10.1080/14616696.2020.1775273>
- Blossfeld H-P, Roßbach H-G (eds) (2019) Education as a lifelong process: the German National Educational Panel Study (NEPS). Edition ZfE, 2nd edn. Springer VS
- Böhn S, Deutscher V (2022) Dropout from initial vocational training – a meta-synthesis of reasons from the apprentice's point of view. *Educ Res Rev* 35:100414. <https://doi.org/10.1016/j.edurev.2021.100414>
- Borrelli LM, Ruedin D (2024) Towards a precise and reflexive use of migration-related terminology in quantitative research: criticism and suggestions. *Comp Migr Stud* 12. <https://doi.org/10.1186/s40878-024-00369-0>
- Brandtstädter J, Renner G (1990) Tenacious goal pursuit and flexible goal adjustment: explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychol Aging* 5:58–67. <https://doi.org/10.1037/0882-7974.5.1.58>
- Breen R, Karlson KB, Holm A (2013) Total, direct, and indirect effects in Logit and Probit models. *Sociol Methods Res* 42:164–191. <https://doi.org/10.1177/0049124113494572>

- Breen R, Bernt Karlson K, Holm A (2021) A note on a reformulation of the KHB method. *Sociol Methods Res* 50:901–912. <https://doi.org/10.1177/0049124118789717>
- Bryant BK, Zvonkovic AM, Reynolds P (2006) Parenting in relation to child and adolescent vocational development. *J Vocat Behav* 69:149–175. <https://doi.org/10.1016/j.jvb.2006.02.004>
- Busse R (2020) Übergangsvverläufe am Ende der Sekundarstufe I: Erklärungsansätze für soziale und migrationsbezogene Ungleichheiten. wbv Media, Bielefeld. <https://doi.org/10.3278/6004818w>
- Busse R, Scharenberg K (2022) How immigrant optimism shapes educational transitions over the educational life course—empirical evidence from Germany. *Front Educ* 7. <https://doi.org/10.3389/educ.2022.894249>
- Busse R, Michaelis C, Nennstiel R (2023) To what extent do secondary effects shape migrants' educational trajectories after lower-secondary education? *Empir Res Voc Ed Train* 15. <https://doi.org/10.1186/s40461-023-00142-0>
- Cedefop (2013) Labour market outcomes of vocational education in Europe: evidence from the European Union labour force survey. Publications Office of the European Union, Luxembourg
- Cedefop (2020) Vocational education and training in Germany: short description. Publications Office of the European Union, Luxembourg
- Cohen J (1988) *Statistical power analysis for the behavioral sciences*, 2nd edn. Lawrence Erlbaum Associates, Hillsdale, NJ
- Del Triana MC, Jayasinghe M, Pieper JR (2015) Perceived workplace racial discrimination and its correlates: a meta-analysis. *J Organ Behav* 36:491–513. <https://doi.org/10.1002/job.1988>
- Dollmann J, Weißmann M (2020) The story after immigrants' ambitious educational choices: real improvement or back to square one? *Eur Sociol Rev* 36:35–47. <https://doi.org/10.1093/esr/jcz042>
- Dombrowski R (2015) *Berufswünsche benachteiligter Jugendlicher*. Bertelsmann, Bielefeld
- Dummert S, Leber U, Schwengler B (2019) Unfilled training positions in Germany – Regional and establishment-specific determinants. *Jahrb fur Natl Stat* 239:661–701. <https://doi.org/10.1515/jbnst-2018-0014>
- Dunn L, Dunn LM (2004) Peabody Picture Vocabulary Test (PPVT-R) (German version). Hogrefe, Göttingen
- Dustmann C, Frattini T, Lanzara G (2012) Educational achievement of second-generation immigrants: an international comparison. *Economic Policy* 27:143–185. <https://doi.org/10.1111/j.1468-0327.2011.00275.x>
- Edwards JR, Shipp AJ (2012) The relationship between person-environment fit and outcomes: an integrative theoretical framework. In: Ostroff C, Judge TA (eds) *Perspectives on organizational fit*. Lawrence Erlbaum Associates, pp 209–258
- Eegdeman I, Meeter M, van Klaveren C (2018) Cognitive skills, personality traits and dropout in Dutch vocational education. *Empir Res Voc Ed Train* 10. <https://doi.org/10.1186/s40461-018-0072-9>
- Elrick J, Farah Schwartzman L (2015) From statistical category to social category: organized politics and official categorizations of 'persons with a migration background' in Germany. *Ethn Racial Stud* 38:1539–1556. <https://doi.org/10.1080/01419870.2014.996240>
- Federal Statistical Office (2022) *Integrierte Ausbildungsberichterstattung [Integrated Training Reporting]*. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bildung-Forschung-Kultur/Schulen/Publicationen/Downloads-Schulen/integrierte-ausbildungsberichterstattung-5211201217005.xlsx?__blob=publicationFile. Accessed 29 February 2024
- Federal Institute of Vocational Education and Training (2018) *Datenreport zum Berufsbildungsbericht 2018. Informationen und Analysen zur Entwicklung der beruflichen Bildung [Data report on the 2018 report on vocational education and training: information and analyses on the development of vocational education and training]*. Barbara Budrich, Leverkusen
- Fibbi R, Lerch M, Wanner P (2006) Unemployment and discrimination against youth of immigrant origin in Switzerland: when the name makes the difference. *J Int Migr Integr* 7:351–366. <https://doi.org/10.1007/s12134-006-1017-x>
- Findeisen S, Jüttler A, Neuenschwander MP, Schumann S (2022) Transition from school to work – explaining persistence intention in Vocational Education and Training in Switzerland. *Vocat Learn* 15:129–154. <https://doi.org/10.1007/s12186-021-09282-4>
- Fischer-Browne M, Ahrens L, Kleinert C, Schels B (2024) Compromises in occupational choice and premature termination of vocational education and training: gender type, prestige, and occupational interests in focus. *Empir Res Voc Ed Train* 16. <https://doi.org/10.1186/s40461-024-00168-y>
- Flohr M, Menze L, Protsch P (2020) Berufliche Aspirationen im Kontext regionaler Berufsstrukturen. *Köln Z Soziol* 72:79–104. <https://doi.org/10.1007/s11577-020-00665-4>
- Flores LY, Robitschek C, Celebi E, Andersen C, Hoang U (2010) Social cognitive influences on Mexican americans' career choices across Holland's themes. *J Vocat Behav* 76:198–210. <https://doi.org/10.1016/j.jvb.2009.11.002>
- Fossati F, Liechti F, Auer D (2020a) Can signaling assimilation mitigate hiring discrimination? Evidence from a survey experiment. *Res Soc Stratif Mobil* 65:100462. <https://doi.org/10.1016/j.rssm.2019.100462>
- Fossati F, Wilson A, Bonoli G (2020b) What signals do employers use when hiring? Evidence from a survey experiment in the apprenticeship market. *Eur Sociol Rev* 36:760–779. <https://doi.org/10.1093/esr/jcaa020>
- Gabrielli G, Impicciatore R (2022) Breaking down the barriers: educational paths, labour market outcomes and wellbeing of children of immigrants. *J Ethn Migr Stud* 48:2305–2323. <https://doi.org/10.1080/1369183X.2021.1935655>
- Gambaro L, Wilhelm J, Schober PS (2023) Gender typicality of occupational aspirations among immigrant and native youth: the role of gender ideology, educational aspirations, and work values. *Front Sociol* 8:1161131. <https://doi.org/10.3389/fsoc.2023.1161131>
- Gambin L, Hogarth T (2016) Factors affecting completion of apprenticeship training in England. *J Educ Work* 29:470–493. <https://doi.org/10.1080/13639080.2014.997679>
- Ganzeboom HB (2010) Occupational status measures for the new international standard classification of occupations ISCO-08. Paper presented at the Annual Conference of International Social Survey Programme
- Ganzeboom HB, de Graaf PM, Treiman DJ (1992) A standard international socio-economic index of occupational status. *Soc Sci Res* 21:1–56. [https://doi.org/10.1016/0049-089X\(92\)90017-B](https://doi.org/10.1016/0049-089X(92)90017-B)
- Glauser D (2015) *Berufsausbildung oder Allgemeinbildung*. Springer Fachmedien Wiesbaden, Wiesbaden. <https://doi.org/10.1007/978-3-658-09096-8>
- Glauser D, Becker R (2016) VET or general education? Effects of regional opportunity structures on educational attainment in german-speaking Switzerland. *Empir Res Voc Ed Train* 8:423. <https://doi.org/10.1186/s40461-016-0033-0>
- Gorodzeisky A, Semyonov M (2017) Labor force participation, unemployment and occupational attainment among immigrants in west European countries. *PLoS ONE* 12:e0176856. <https://doi.org/10.1371/journal.pone.0176856>

- Gottfredson LS (1981) Circumscription and compromise: a developmental theory of occupational aspirations. *J Couns Psychol* 28:545–579. <https://doi.org/10.1037/0022-0167.28.6.545>
- Gottfredson LS (1996) Gottfredson's theory of circumscription and compromise. In: Brown D, Brooks L (eds) *Career choice and development*. Jossey-Bass, San Francisco, pp 179–232
- Gries T, Redlin M, Zehra M (2022) Educational assimilation of first-generation and second-generation immigrants in Germany. *J Int Migr Integr* 23:815–845. <https://doi.org/10.1007/s12134-021-00863-9>
- Hadjar A, Scharf J (2019) The value of education among immigrants and non-immigrants and how this translates into educational aspirations: a comparison of four European countries. *J Ethn Migr Stud* 45:711–734. <https://doi.org/10.1080/1369183X.2018.1433025>
- Hardie JH (2014) The consequences of unrealized occupational goals in the transition to adulthood. *Soc Sci Res* 48:196–211. <https://doi.org/10.1016/j.ssresearch.2014.06.006>
- Heath AF, Brinbaum Y (2007) Guest editorial. *Ethnicities* 7:291–304. <https://doi.org/10.1177/1468796807080230>
- Heath AF, Rothon C, Kilpi E (2008) The second generation in Western Europe: education, unemployment, and occupational attainment. *Annu Rev Sociol* 34:211–235. <https://doi.org/10.1146/annurev.soc.34.040507.134728>
- Heckhausen J, Tomasik MJ (2002) Get an apprenticeship before school is out: how German adolescents adjust vocational aspirations when getting close to a developmental deadline. *J Vocat Behav* 60:199–219. <https://doi.org/10.1006/jvbe.2001.11864>
- Held J (2015) *Jugendliche im Übergang von Schule zum Beruf: Berufsorientierung junger Migrantinnen und Migranten*. Budrich UniPress Limited. <https://doi.org/10.2307/j.ctvdf0bxt>
- Holtmann AC, Solga H (2023) Dropping or stopping out of apprenticeships: the role of performance- and integration-related risk factors. *Z Erziehungswiss* 26:469–494. <https://doi.org/10.1007/s11618-023-01151-1>
- Imdorf C (2017) Understanding discrimination in hiring apprentices: how training companies use ethnicity to avoid organisational trouble. *J Vocat Educ Train* 69:405–423. <https://doi.org/10.1080/13636820.2016.1278397>
- Jonsson JO, Rudolphi F (2011) Weak performance – strong determination: School achievement and educational choice among children of immigrants in Sweden. *Eur Sociol Rev* 27:487–508. <https://doi.org/10.1093/esr/jcq021>
- Kalter F, Jonsson JO, van Tubergen F, Heath A (2018) Growing up in diverse societies. *British Academy*
- Kamm C, Gomensoro A, Heers M, Hupka-Brunner S (2023) Aspiring high in the Swiss VET-Dominated Education System: second generation young adults and their immigrant parents. *J Vocat Educ Train* 75:155–174. <https://doi.org/10.1080/13636820.2022.2139746>
- Kao G, Tienda M (1995) Optimism and achievement: the educational performance of immigrant youth. *Soc Sci Q* 76:1–19
- Karlson KB, Holm A, Breen R (2012) Comparing regression coefficients between same-sample nested models using Logit and Probit. *Sociol Methodol* 42:286–313. <https://doi.org/10.1177/0081175012444861>
- Kayser H, Steinritz G, Ziegler B (2013) Assessing occupational aspirations for vocational counselling. In: Seifried J, Wuttke E (eds) *Transitions in Vocational Education*. Verlag Barbara Budrich, Opladen, pp 19–35
- Kilpi-Jakonen E (2011) Continuation to upper secondary education in Finland: children of immigrants and the majority compared. *Acta Sociol* 54:77–106. <https://doi.org/10.1177/0001699310392604>
- Kleinert C, Jacob M (2013) Demographic changes, labor markets and their consequences on post-school-transitions in West Germany 1975–2005. *Res Soc Stratif Mobil* 32:65–83. <https://doi.org/10.1016/j.rssm.2013.01.004>
- Kohler U, Karlson KB, Holm A (2011) Comparing coefficients of nested nonlinear probability models. *Stata J* 11:420–438. <https://doi.org/10.1177/1536867X1101100306>
- Kristof-Brown AL, Zimmerman RD, Johnson EC (2005) Consequences of individuals' fit at work: a meta-analysis of person–job, person–organization, person–group, and person–supervisor fit. *Pers Psychol* 58:281–342. <https://doi.org/10.1111/j.1744-6570.2005.00672.x>
- Krötz M (2024) Structuring the complexity of drop-out from VET: a theoretical framework guiding empirical research perspectives. *Empir Res Voc Ed Train* 16. <https://doi.org/10.1186/s40461-023-00155-9>
- Krötz M, Deutscher V (2022) Drop-out in dual VET: why we should consider the drop-out direction when analysing drop-out. *Empir Res Voc Ed Train* 14:1. <https://doi.org/10.1186/s40461-021-00127-x>
- Laporte C, Mueller RE (2013) The completion behaviour of registered apprentices in Canada: who continues, who quits, and who completes programs? *Empir Res Voc Ed Train* 5. <https://doi.org/10.1186/1877-6345-5-1>
- Little RJ, Rubin DB (2019) *Statistical analysis with missing data* (third edition). Wiley
- Ma B, Krötz M, Deutscher V, Winther E (2024) Exploring the interplay between vocational competence and dropout intention: insights and perspectives. *Empir Res Voc Ed Train* 16. <https://doi.org/10.1186/s40461-024-00164-2>
- Matthes B, Meinken H, Neuhauser P (2015) *Berufssektoren und Berufssegmente auf der Grundlage der KldB 2010*. https://statistik.arbeitsagentur.de/DE/Statischer-Content/Grundlagen/Methodik-Qualitaet/Methodenberichte/Uebergreifend/Generische-Publikationen/Methodenbericht-Berufssektoren-und-Berufssegmente.pdf?__blob=publicationFile
- McElvany N, Ferdinand HD, Gebauer MM, Bos W, Huelmann T, Köller O, Schöber C (2018) Attainment-aspiration gap in students with a migration background: the role of self-efficacy. *Learn Individ Differ* 65:159–166. <https://doi.org/10.1016/j.lindif.2018.05.002>
- Meeuwisse M, Severiens SE, Born MP (2010) Reasons for withdrawal from higher vocational education. A comparison of ethnic minority and majority non-completers. *Stud High Educ* 35:93–111. <https://doi.org/10.1080/03075070902906780>
- Michaelis C, Busse R (2021) Regional disparities in the training market: opportunities for adolescents to obtain a company-based training place depending on Regional Training Market conditions. *IJRVT* 8:87–114. <https://doi.org/10.13152/IJRVE.T8.1.5>
- Michaelis C, Findeisen S (2022) Influence of person-vocation fit on satisfaction and persistence in Vocational Training Programs. *Front Psychol* 13:834543. <https://doi.org/10.3389/fpsyg.2022.834543>
- Michaelis C, Findeisen S (2024) Different dropout directions in vocational education and training: the role of the initiating party and trainees' reasons for dropping out. *Empir Res Voc Ed Train* 16. <https://doi.org/10.1186/s40461-024-00169-x>
- Michaelis C, Richter M (2022) Discontinuities in vocational education and training: the influence of early-risk factors and personality constructs on premature training termination and subsequent trajectories. *Empir Res Voc Ed Train* 14. <https://doi.org/10.1186/s40461-022-00135-5>

- Michaelis C, Busse R, Seeber S, Eckelt M (2022) Nachschulische Bildungsverläufe in Deutschland: Schulentlassene zwischen institutionalisierten Idealwegen und schwierigen Umwegen. wbv Publikation, Bielefeld. <https://doi.org/10.3278/9783763973125>
- Möser S, Glauser D, Becker R (2019) Valuation of labour market entrance positions among (future) apprentices – results from two discrete choice experiments. *J Choice Model* 33:100180. <https://doi.org/10.1016/j.jocm.2019.100180>
- National Educational Panel Study [NEPS] (2013) Starting Cohort 4: 9th Grade (SC4). Waves 1 and 2 (Scientific Use File Version 1.1.0) [Questionnaire]. Leibniz Institute for Educational Trajectories (LifBi). https://www.neps-data.de/Portals/0/NEPS/Datenzentrum/Forschungsdaten/SC4/1-1-0/SC4_1-1-0_Q_w1_2_en.pdf Accessed 15 June 2024
- National Educational Panel Study [NEPS] (2019) Starting Cohort 4 – Grade 9. School and vocational training – educational pathways of students in Grade 9 and higher. Wave 10 – 10.0.0 [Questionnaire]. Leibniz Institute for Educational Trajectories (LifBi). https://www.neps-data.de/Portals/0/NEPS/Datenzentrum/Forschungsdaten/SC4/10-0-0/SC4_10-0-0_w10_en.pdf Accessed 15 June 2024
- Nennstiel R (2021) Do more demanding lower secondary school certificates for minority students pay off? A comparison of VET access between Germany and German-speaking Switzerland. *SozW* 72:313–342. <https://doi.org/10.5771/0038-6073-2021-3-313>
- Nennstiel R (2022) Explaining ethnic differences in Access to VET in German-speaking Switzerland: the effects of application behavior and resources. *Z fur Soziol* 50:396–414. <https://doi.org/10.1515/zfsoz-2021-0024>
- NEPS Network (2021) National Educational Panel Study, Scientific Use File of Starting Cohort Grade 9. Leibniz Institute for Educational Trajectories (LifBi), Bamberg. <https://doi.org/10.5157/NEPS:SC4:12.0.0>
- Neumark D (2018) Experimental research on labor market discrimination. *J Econ Lit* 56:799–866. <https://doi.org/10.1257/jel.20161309>
- Nießen D, Danner D, Spengler M, Lechner CM (2020) Big five personality traits predict successful transitions from school to vocational education and training: a large-scale study. *Front Psychol* 11:1827. <https://doi.org/10.3389/fpsyg.2020.01827>
- Nießen D, Wicht A, Schoon I, Lechner CM (2022) You can't always get what you want: prevalence, magnitude, and predictors of the aspiration–attainment gap after the school-to-work transition. *Contemp Educ Psychol* 71:102091. <https://doi.org/10.1016/j.cedpsych.2022.102091>
- Nießen D, Wicht A, Lechner CM (2023) Aspiration–attainment gaps predict adolescents' subjective well-being after transition to vocational education and training in Germany. *PLoS ONE* 18:e0287064. <https://doi.org/10.1371/journal.pone.0287064>
- OECD (2005) From education to work. A difficult transition for young adults with low levels of education. OECD Publishing, Paris
- OECD (2016) PISA 2015: PISA – results in Focus. OECD Publishing
- OECD (2023a) PISA 2022 results (volume I): the State of Learning and Equity in Education. OECD Publishing, Paris
- OECD (2023b) Spotlight on vocational education and training: findings from Education at a Glance 2023. OECD Publishing, Paris. <https://doi.org/10.1787/acff263d-en>
- Patzina A, Wydra-Somaggio G (2020) Early careers of dropouts from vocational training: signals, human capital formation, and Training firms. *Eur Sociol Rev* 36:741–759. <https://doi.org/10.1093/esr/jcaa011>
- Paulus W, Matthes B (2013) The German classification of occupations 2010 – structure, coding and conversion table. https://dok.uni.de/fdz/repote/2013/MR_08-13_EN.pdf
- Plenty SM, Jonsson JO (2021) Students' occupational aspirations: can family relationships account for differences between immigrant and socioeconomic groups? *Child Dev* 92:157–173. <https://doi.org/10.1111/cdev.13378>
- Protsch P (2017) Getting a foot in the door: how organisational characteristics shape recruitment decisions in the dual apprenticeship system. *J Educ Work* 30:585–598. <https://doi.org/10.1080/13639080.2017.1292029>
- Protsch P, Solga H (2015) How employers use signals of cognitive and noncognitive skills at labour market entry: insights from field experiments. *Eur Sociol Rev* 31:521–532. <https://doi.org/10.1093/esr/jcv056>
- Protsch P, Solga H (2016) The social stratification of the German VET system. *J Educ Work* 29:637–661. <https://doi.org/10.1080/13639080.2015.1024643>
- Protsch P, Solga H (2017) Going across Europe for an apprenticeship? A factorial survey experiment on employers' hiring preferences in Germany. *J Eur Soc Policy* 27:387–399. <https://doi.org/10.1177/0958928717719200>
- Quintini G, Manfredi T (2009) Going separate ways? School-to-work transitions in the United States and Europe. <https://www.oecd-ilibrary.org/docserver/221717700447.pdf?expires=1709558793&id=id&accname=guest&checksum=9A726CDDF798C807A13DA22E1A627402>. Accessed 4 March 2024
- Rehberg RA (1967) Adolescent career aspirations and expectations: evaluation of two contrary stratification hypotheses. *Pac Sociol Rev* 10:81–90. <https://doi.org/10.2307/1388426>
- Rohrbach-Schmidt D, Uhly A (2015) Determinanten vorzeitiger Lösungen von Ausbildungsverträgen und berufliche Segmentierung im dualen System. Eine Mehrebenenanalyse auf Basis der Berufsbildungsstatistik. *Köln Z Soziol* 67:105–135. <https://doi.org/10.1007/s11577-014-0297-y>
- Rojewski JW (2005) Occupational aspirations: constructs, meanings, and application. In: Brown SD, Lent RW (eds) *Career development and counseling: putting theory and research to work*. John Wiley & Sons, Inc., Hoboken, New Jersey, pp 131–154
- Salikutluk Z (2016) Why do immigrant students Aim High? Explaining the aspiration–achievement paradox of immigrants in Germany. *Eur Sociol Rev* 32:581–592. <https://doi.org/10.1093/esr/jcw004>
- Salvisberg A, Sacchi S (2014) Labour market prospects of Swiss career entrants after completion of vocational education and training. *Eur Soc* 16:255–274. <https://doi.org/10.1080/14616696.2013.821623>
- Schels B, Abraham M (2023) Adaptation to the market? Status differences between target occupations in the application process and realized training occupation of German adolescents. *J Vocat Educ Train* 75:722–743. <https://doi.org/10.1080/13636820.2021.1955403>
- Schels B, Schwarz L (2020) Sind Auszubildende mit Migrationshintergrund schlechter gestellt? Ressourcen, Berufsaspirationen und ethnische Unterschiede im sozioökonomischen Status des Ausbildungsberufs. *SozW* 71:407–439. <https://doi.org/10.5771/0038-6073-2020-4-407>
- Schels B, Kleinert C, Fischer-Browne M, Ahrens L (2022) Compromises between occupational aspirations and VET occupations – a contribution to the reproduction of social inequalities? *Z. fur Soziol* 51:154–173. <https://doi.org/10.1515/zfsoz-2022-0011>
- Schmaus M, Kristen C (2022) Foreign accents in the early hiring process: a field experiment on accent-related ethnic discrimination in Germany. *Int Migrat Rev* 56:562–593. <https://doi.org/10.1177/01979183211042004>

- Schmid E, Haukedal CL (2022) Identifying resilience promoting factors in vocational education and training: a longitudinal qualitative study in Norway. *Empir Res Voc Ed Train* 14. <https://doi.org/10.1186/s40461-022-00139-1>
- Seeber S, Wieck M, Baethge-Kinsky V, Boschke V, Michaelis C, Busse R, Geiser P (2019a) Ländermonitor Berufliche Bildung 2019: Ein Vergleich der Bundesländer mit vertiefender Analyse zu Passungsproblemen im dualen System. wbv Media, Bielefeld
- Seeber S, Busse R, Michaelis C, Baethge M (2019b) Migration in der beruflichen Bildung: Herausforderungen für die Integration von zugewanderten schutz- und asylsuchenden Jugendlichen. *Z Erziehungswiss* 22:71–99. <https://doi.org/10.1007/s11618-019-00890-4>
- Sharf RS (2013) Advances in theories of career development. In: Walsh B, Savickas ML, Hartung P (eds) *Handbook of vocational psychology*. Routledge, New York, pp 3–32
- Spence M (1973) Job market signaling. *Q J Econ* 87:355. <https://doi.org/10.2307/1882010>
- Starbuck WH (1963) Level of aspiration theory and economic behavior. *Syst Res* 8:128–136. <https://doi.org/10.1002/bs.3830080205>
- Thijssen L, Lancee B, Veit S, Yemane R (2021) Discrimination against Turkish minorities in Germany and the Netherlands: field experimental evidence on the effect of diagnostic information on labour market outcomes. *J Ethn Migr Stud* 47:1222–1239. <https://doi.org/10.1080/1369183X.2019.1622793>
- Thurow LC (1975) *Generating Inequality: mechanisms of distribution in the U.S. economy*. Basic Books, New York
- Thurow LC (1978) Die Arbeitskräfteschlange und das Modell des Arbeitsplatzwettbewerb. *Probleme Der Arbeitsmarktsegmentation*. In: Sengenber W (ed) *Der Gespaltene Arbeitsmarkt. Probleme Der Arbeitsmarktsegmentation*. Campus, Frankfurt/Main, pp 117–137
- Tjaden JD, Scharenberg K (2017) Ethnic choice effects at the transition into upper-secondary education in Switzerland. *Acta Sociol* 60:309–324. <https://doi.org/10.1177/0001699316679491>
- Tomasik MJ, Hardy S, Haase CM, Heckhausen J (2009) Adaptive adjustment of vocational aspirations among German youths during the transition from school to work. *J Vocat Behav* 74:38–46. <https://doi.org/10.1016/j.jvb.2008.10.003>
- Volodina A, Nagy G (2016) Vocational choices in adolescence: the role of gender, school achievement, self-concepts, and vocational interests. *J Vocat Behav* 95–96:58–73. <https://doi.org/10.1016/j.jvb.2016.07.005>
- Volodina A, Nagy G, Köller O (2015) Success in the first phase of the vocational career: the role of cognitive and scholastic abilities, personality factors, and vocational interests. *J Vocat Behav* 91:11–22. <https://doi.org/10.1016/j.jvb.2015.08.009>
- von Collani G, Herzberg PY (2003) Eine revidierte Fassung der deutschsprachigen Skala zum Selbstwertgefühl von Rosenberg. *Zeitschrift für Differentielle und Diagnostische Psychologie* 24:3–7. <https://doi.org/10.1024/0170-1789.24.1.3>
- von Hippel PT (2007) Regression with missing Ys: An improved strategy for analyzing multiply imputed data. *Social Methodol* 37: 83–117. <https://doi.org/10.1111/j.1467-9531.2007.00180.x>
- Weßling K, Hartung A, Hillmert S (2015) Spatial structure counts: the relevance of regional labour-market conditions for educational transitions to vocational training. *Empir Res Voc Ed Train* 7. <https://doi.org/10.1186/s40461-015-0024-6>
- Weßling K, Hartung A, Hillmert S (2023) School-to-work transitions under unequal conditions: a regionalised perspective on the 'discouraged worker' hypothesis. *Soc Sci* 12. <https://doi.org/10.3390/socsci12100547>
- Wicht A (2016) Occupational aspirations and ethnic school segregation: social contagion effects among native German and immigrant youths. *J Ethn Migr Stud* 42:1825–1845. <https://doi.org/10.1080/1369183X.2016.1149455>
- Winther E, Achtenhagen F (2009) Measurement of vocational competencies — a contribution to an international large-scale assessment on vocational education and training. *Empir Res Voc Ed Train* 1:85–102. <https://doi.org/10.1007/BF03546481>
- Woelfel J, Haller AO (1971) Significant others, the self-reflexive act and the attitude formation process. *Am Sociol Rev* 36:74–87. <https://doi.org/10.2307/2093508>
- Wydra-Somaggio G (2021) Early termination of vocational training: dropout or stopout? *Empir Res Voc Ed Train* 13. <https://doi.org/10.1186/s40461-021-00109-z>
- Yi H, Zhang L, Yao Y, Wang A, Ma Y, Shi Y, Chu J, Loyalka P, Rozelle S (2015) Exploring the dropout rates and causes of dropout in upper-secondary technical and vocational education and training (TVET) schools in China. *Int J Educational Dev* 42:115–123. <https://doi.org/10.1016/j.ijedudev.2015.04.009>
- Zimmermann T (2019) Social influence or rational choice? Two models and their contribution to explaining class differentials in student educational aspirations. *Eur Sociol Rev* 43:1–17. <https://doi.org/10.1093/esr/jcz054>
- Zimmermann T (2024) Explaining differences in decision-relevant educational knowledge between parents with and without an immigrant background in Germany. *Res Soc Stratif Mobil* 90:100894. <https://doi.org/10.1016/j.rssm.2024.100894>
- Zschirnt E (2020) Evidence of hiring discrimination against the second generation: results from a correspondence test in the Swiss labour market. *J Int Migr Integr* 21:563–585. <https://doi.org/10.1007/s12134-019-00664-1>
- Zschirnt E, Ruedin D (2016) Ethnic discrimination in hiring decisions: a meta-analysis of correspondence tests 1990–2015. *J Ethn Migr Stud* 42:1115–1134. <https://doi.org/10.1080/1369183X.2015.1133279>
- Glauser D, Becker R (2023) Gendered ethnic choice effects at the transition to upper secondary education in Switzerland. *Front Sociol* 8. <https://doi.org/10.3389/fsoc.2023.1158071>
- Ferrara A, Salikutluk Z (2024) Ambitious misaligned or uncertain? The occupational and educational aspirations of immigrant-origin youth in Germany. *J Ethn Migr Stud*. <https://doi.org/10.1080/1369183X.2024.2378213>
- Bukodi E, Goldthorpe JH (2013) Decomposing 'social origins': The effects of parents' class, status, and education on the educational attainment of their children. *Eur Sociol Rev* 29:1024–1039. <https://doi.org/10.1093/esr/jcs079>
- LifBi (2011) Information on Competence Testing: NEPS Starting Cohort 4 - Grade 9. https://www.neps-data.de/Portals/0/NEPS/Datenzentrum/Forschungsdaten/SC4/1-0-0/NEPS_SC4_Competerences_W1_en.pdf. Accessed 29 April 2020
- Tsaousides T, Jome L (2008) Perceived career compromise, affect and work-related satisfaction in college students. *J Vocat Behav* 73:185–194. <https://doi.org/10.1016/j.jvb.2008.04.003>
- Eberhard V, Christ A (2019) Wer findet eine Ausbildung im Wunschberuf? https://res.bibb.de/vet-repository_775697. Accessed 29 February 2024

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