

## Secondary Publication



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Date of secondary publication: 16.10.2025

Version of Record (Published Version), Article

Persistent identifier: urn:nbn:de:bvb:473-irb-110842x

#### **Primary publication**

Fischer-Browne, Melanie; Ahrens, Lea; Kleinert, Corinna; Schels, Brigitte (2024): Compromises in occupational choice and premature termination of vocational education and training : gender type, prestige, and occupational interests in focus, in: Empirical Research in Vocational Education and Training, Luxemburg: Springer Science and Business Media LLC, Vol. 16, Nr. 14, pp. 1–20, doi: 10.1186/s40461-024-00168-y.

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RESEARCH

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# Compromises in occupational choice and premature termination of vocational education and training: gender type, prestige, and occupational interests in focus

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## Abstract

This study examines whether premature termination of vocational education and training (VET) is more likely when trainees have to make compromises between their realistic occupational aspirations and the occupation for which they are trained in terms of the occupational dimensions of gender type, prestige, and occupational interests. Specifically, it examines the relative importance of the three compromise dimensions on premature VET termination. The study is based on a sample of 3,241 VET entrants from a cohort of ninth graders in 2010 in the German National Educational Panel Study (NEPS-SC4) in combination with aggregated data on occupational characteristics. Results from discrete hazard rate models indicate a higher risk of premature VET termination for trainees whose VET occupation differs from their realistic occupational aspiration from their school days. While compromises in prestige have no overall effect, both compromises in interests and gender type threaten the stability of VET. The results also indicate that compromises in interests have the strongest effect on the risk of premature VET termination and that the effects of compromises in gender type are partly mediated by the effects of compromises in interests. Furthermore, sensitivity analysis revealed that the main effects of compromises in gender type and prestige are gender specific.

**Keywords** Premature termination of vocational training, Germany, Occupational compromising, Gender type, Prestige, Occupational interests

## Introduction

Occupational choice has been described as a process of circumscription and compromise (Gottfredson 2002). During childhood and adolescence, individuals define a field of possible occupations that match their self-perceptions based on three dimensions: the gender type of an occupation, its prestige, and its interest profile. The present study aims to examine the consequences of occupational compromises in these dimensions in the crucial transition from school to vocational education and training (VET) for the stability of VET. To this end, we look at premature VET termination, i.e. leaving VET

early before graduation, regardless of whether this means dropping out or changing to another VET position. Using data from Germany, we examine how compromises in gender type, prestige, and occupational interests between individuals' realistic occupational aspirations and their first VET occupation affect the risk of premature VET termination, and the relative importance of these three dimensions.

Several countries have a strong occupation-specific upper secondary VET system that provides a close link between education and labor market outcomes. Important examples are European countries such as Austria, Denmark, Germany or Switzerland. In these countries, but also in other countries with occupation-specific education, the close link between education and labor market outcomes is an important feature influencing the consequences of educational and occupational choices (DiPrete et al. 2017). In Germany, adolescents can choose from more than 300 highly specific VET occupations, knowing well that the choice of one particular VET occupation will probably determine their entire career. However, the young people's choices are limited by institutionalized access rules and recruitment processes through which employers select their skilled workers (Kleinert and Jacob 2019). In these systems, premature VET termination constitutes a pressing issue. Official statistics show that in Germany, one in four VET contracts was terminated prematurely in the last decade (Bundesinstitut für Berufsbildung 2018). Therefore, it is of great importance to investigate which explanatory approaches compromises between occupational aspirations and first VET can provide for premature VET termination.

This study connects to two strands of the literature. The first strand of research has considered that work-related outcomes such as career success, job satisfaction, and employment stability are promoted when people enter occupations that match their preferences along the three dimensions of occupational gender type, prestige, and interests. Studies have found evidence regarding interest match (Michaelis and Findeisen 2022; Nye et al. 2012; Spokane and Cruza-Guet 2005; Su 2012; van Iddekinge et al. 2011), (mis)match in terms of aspired prestige, mainly perceived company prestige (Carmeli and Freund 2009; Ciftcioglu 2010; Gjerustad 2016; Hesketh and McLachlan 1991; Kamasak 2011; Mignonac et al. 2006), and gender type (Rohrbach-Schmidt and Uhly 2015). However, most of this literature, has considered only single dimensions and not the consequences of co-occurring compromises in gender type, prestige, or occupational interests. Furthermore, it has examined adults in the workforce, who might have more pronounced occupational aspirations than adolescents in VET.

Second, research on school-to-work transitions has examined factors that increase instability in early careers. Studies have shown that the likelihood of premature VET termination depends on firms' investments, trainees' performance, and the availability of alternatives. Likewise, manifest reasons, such as poor training conditions, job dissatisfaction, perceived fit, lack of motivation, or perceived stress play a role (e.g., Bessey and Backes-Gellner 2015; Chan 2016; Forster-Heinzer et al. 2016; Gambin and Hogarth 2016; Michaelis and Findeisen 2022; Powers and Watt 2021; Rohrbach-Schmidt and Uhly 2015). Other studies have examined job (dis)satisfaction or distress in early career as a result of compromises between different job characteristics such as status or opportunities for control (e.g., Creed and Blume 2013; Creed and Hughes 2013; Creed and Gagliardi 2015; Hardie 2014; Hesketh and McLachlan 1991; Tsaousides and Jome 2008). Some studies show that entering a training occupation that does not align with

the desired occupation increases the likelihood of premature VET termination (e.g. Holtmann and Solga 2023). Very few studies specify the type of misfit, or compromises, examining the impact of the gender type of the training occupation (Rohrbach-Schmidt and Uhly 2015) or compromises between training occupations and occupational aspirations in terms of gender type and social status (Beckmann et al. 2023) on the risk of dropping out of VET. This strand of research has shown the importance of aspirations and early choices for early career stability, but rarely with a focus on the occupational dimensions that Gottfredson (2002) considers relevant, or only on selected dimensions. In particular, the relevance of compromises in interests is understudied in this context. More specifically, previous research has not yet considered how compromises in gender type, prestige, and interest profiles of occupations matter after entry into VET, particularly when the three dimensions are considered jointly.

The present study makes three contributions to the relevant research. First, it contributes to theory development regarding the consequences of compromise formation processes by combining two different theoretic approaches. Gottfredson's approach (2002) allows us to identify the dimensions of occupational aspirations that matter to adolescents in the process of occupational choice and to describe the compromises they make when entering VET. In contrast to the everyday use of the term "compromise", compromises in occupational choice in Gottfredson's sense involve not only "downward" adjustments, but also adjustments to better occupational alternatives, for example, in terms of prestige (Heckhausen and Tomasik 2002; Schels et al. 2022). To make predictions about the consequences of such compromises for young people in VET, we draw on person-environment-fit theory (P-E-fit theory) (Edwards and Shipp 2012). P-E-fit theory allows us to derive hypotheses about how the different dimensions of compromise jointly affect the risks of premature VET termination, especially when they take on different forms, such as entering more or less gender-typical and more or less prestigious occupations (Beckmann et al. 2023).

Second, our study contributes to the empirical research on premature VET termination and training dropout. We shed light on the under-researched question of how different dimensions, types, and configurations of compromises between realistic occupational aspirations held in school days and first VET occupations affect premature VET termination. Our study adds to the existing literature by taking compromises in occupational interests into account and by jointly examining the significance of deviations of VET occupations from occupational aspirations in relation to three dimensions - gender type, occupational prestige, and occupational interests. We also investigate the possibility that compromises in gender type and prestige of occupations might have different consequences for men and women.

Third, we contribute to the measurement of compromises by comparing the realistic occupational aspirations and VET occupations of adolescents in terms of their gender type, prestige, and interest profiles, using data from official statistics, prestige scales, and information from the O\*Net. We combine aggregated occupational data from official data sources with survey data from the German National Educational Panel Study, Starting Cohort 4 (NEPS-SC4) (Blossfeld and Rossbach 2019). The combination of these data allows us to compare the occupational aspirations from school days to the first VET occupations and to derive novel measures of compromises in occupational gender type, prestige, and interest profiles.

## Theoretical considerations

### Compromising and its consequences for premature VET termination

One of the most influential theories describing the process of occupational choice is Gottfredson's theory of circumscription and compromise (Gottfredson 2002), which combines sociological and psychological perspectives. Its basic assumption is that during the process of occupational choice, which begins years before entering VET, young people strive to achieve a fit between person and occupation. In the stage of circumscription, they form a zone of acceptable occupational alternatives by comparing occupations with their self-concept and preferring those that have a high degree of match.

Because occupations are multi-dimensional in nature, researchers must make assumptions about which dimensions matter in the process of occupational choice. According to Gottfredson (2002, p. 88), three aspects are crucial for individuals. First, there is the *gender type* of occupations - the extent to which occupations are understood as masculine or feminine. Children become aware of the gender connotation of occupations quite early on, at the age of 6 to 8 (Gottfredson 2002, p. 96). In the next few years (at ages 9 to 13), they also begin to compare occupational *prestige* levels with their own social standing, taking into account the links between income, education, and occupation, and comparing them with self-perceived ability and the zones of social acceptance in their families (Gottfredson 2002, p. 97). Adolescents develop their field of acceptable occupations defined by upper and lower bounds of aspired prestige and gender type. Beginning at age 14, adolescents align themselves with their unique, internal selves and restrict the zone of acceptable alternatives to areas of work that correspond to their *occupational interests* (Gottfredson 2002, p. 100).

In the subsequent stage of compromising, adolescents move from idealistic occupational aspirations - their dream jobs - to less compatible, but increasingly realistic occupational aspirations, often referred to as occupational expectations (Gottfredson 2002). Compromise formation accelerates when young people face a choice deadline, such as when they have to apply for VET positions before leaving school. At this stage, idealistic and realistic aspirations increasingly converge (Heckhausen and Tomasik 2002), also because the adjustment of occupational aspirations is a precondition for the successful transition to VET (Tomasik et al. 2009). Successful transition to VET involves applying for a specific VET occupation and being selected by the training provider. As this is often not successful, new applications have to be made. Hence, the transition to VET often involves further compromises between idealistic alternatives and realistic opportunities. If the aspired occupation cannot be realized, some trainees may find alternative training positions with similar occupational characteristics (Schels et al. 2022), while others have to make stronger compromises that may even go beyond their acceptable boundaries of gender type, prestige, or interest profile. According to Gottfredson (2002), however, adolescents try to avoid this, and tend to take mainly occupations within their zone of acceptable occupational alternatives into account. Hence, these three dimensions are crucial as well in the stage of compromising.

The strength of Gottfredson's concept lies in its capacity to explain the formation and adaptation of occupational aspirations. However, the theory has not considered the consequences of compromises after the initial choice has been made. When young people enter VET, their occupational choice is put to the test. For educational systems with a strong VET sector, sequential concepts of occupational choice have been postulated

(e.g., Buchmann and Kriesi 2009). According to these concepts, the phase of searching for a VET position is followed by a phase of consolidation (Herzog et al. 2006). In this phase, the realistic occupational aspiration is an important reference point for trainees (Hardie 2014; Heath et al. 1999). Since particularly three dimensions of their aspired occupation, gender type, prestige and interest profile, are crucial for individuals, they re-evaluate the VET occupation they have entered and, if they find that it is not in line with their self-concept in terms of these dimensions, they reconsider and may terminate VET prematurely (Herzog et al. 2006).

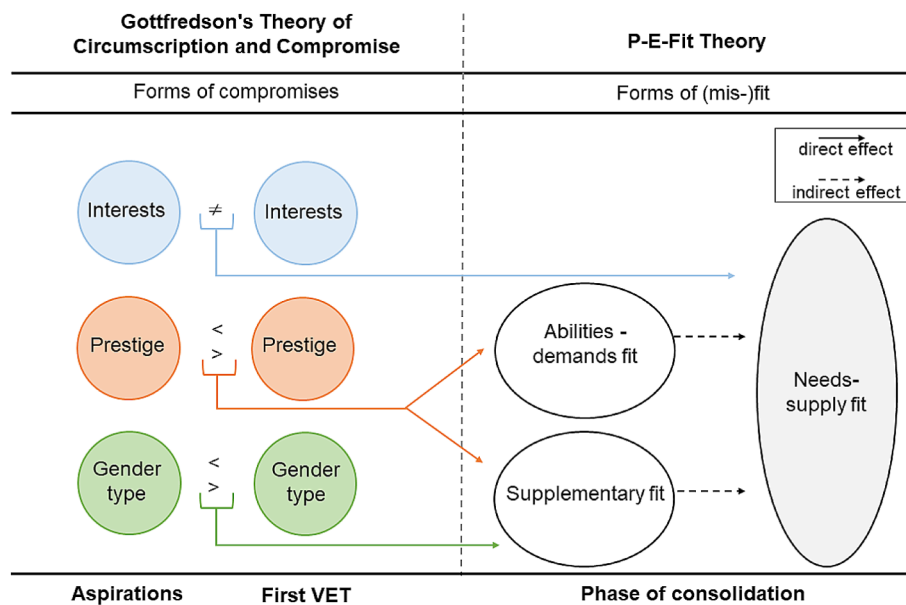
The basic idea of the consequences of compromises between the trainees' preferences and actual VET occupations is emphasized by the P-E-fit theory, which states that the cognitive comparison of actual and aspired aspects of the job affects job satisfaction as an emotional response (Cranny et al. 1992). Accordingly, empirical research inspired by the P-E-fit theory has often examined affective outcomes such as job satisfaction, stress, and well-being, which have an impact on the risk of turnover and dropout (Creed and Gagliardi 2015; Edwards and Shipp 2012; Hardie 2014). The theory predicts that the greater the discrepancy between actual and desired aspects of the job, the less satisfied employees will be with their jobs, and accordingly, the more likely they are to quit the job. Now again, following Gottfredson's (2002) basic assumption that three aspects of jobs are particularly important to individuals, their gender type, their prestige and their potential to realize one's occupational interests, discrepancies in these aspects should be significant predictors of the risk of premature VET termination.

**H1:** Compromises between trainees' realistic occupational aspirations and their first VET occupation in terms of gender type (H1a), prestige (H1b), or interest profile (H1c) increase the risk of premature VET termination.

### Functional form of compromises

Compromises in interests versus gender type and prestige differ in terms of the functional form they can take. Occupational interests can be defined as an individual's preferences for situations or contexts in which certain activities occur, which motivate goal-oriented behaviour and orient individuals toward certain occupational environments (Nye et al. 2012; Su and Rounds 2014). Occupational interests may vary between individuals, and likewise the typical or dominant task content of a particular occupation can also be described by the potential to realize different occupational interests. The closer the environment and the individual are in their occupational interest profiles, the higher are the job satisfaction and job performance (Holland 1997). Hence, compromises in occupational interests are deviations between the preferred occupational interests of an individual and the potential of a VET occupation to realize these interests. Their functional form is unidirectional, ranging from no deviation to full deviation.

In contrast, compromises in the two social compromise dimensions can point in two different directions: the prestige of the VET occupation can be lower or higher than the prestige of the occupational aspiration; the gender type of the VET occupation can also be more or less gender-typical than the occupational aspiration (for illustration, see Fig. 1, left panel). The P-E fit theory suggests that an undersupply of needs always leads to dissatisfaction (Edwards and Shipp 2012). In contrast, an oversupply of needs only has



**Fig. 1** Theoretical integration of Gottfredson's theory (2002) and P-E-fit Theory (Edwards and Shipp 2012)

negative effects if it interferes with fulfilling other needs or if it reduces the availability of this kind of supply in the future.

If we apply these considerations to the impact of compromises on premature VET termination, they imply that entering a *less* gender-typical and *less* prestigious occupation than the occupational aspiration increases the risk of premature VET termination, because the needs for same-gender affiliation, social belonging, and status maintenance would not be sufficiently fulfilled. A compromise in terms of *higher* gender type or *higher* prestige does not reduce future supply related to needs for belonging, affiliation, and support. However, an oversupply in these dimensions may interfere with other needs for some individuals. Given the gender inequalities in the highly segregated occupational structure of VET, a higher gender type may impair the compatibility of family and career or future earnings. Entering a more prestigious VET occupation may be rewarding, but it also places higher demands on the individual, thus challenging the need for competence. Since entering a more gender-typical or more prestigious occupation than the occupation aspired to does not have to have negative consequences for all VET entrants, less pronounced effects are to be expected if there is an oversupply of prestige and gender type.

**H2a:** Compromises in terms of entering less gender-typical VET occupations than aspired to increase the risk of premature VET termination more than compromises in terms of entering more gender-typical VET occupations than aspired to.

**H2b:** Compromises in terms of entering less prestigious VET occupations than aspired to increase the risk of premature VET termination more than compromises in terms of entering more prestigious VET occupations than aspired to.

### Strength of effects

An unresolved question in previous research has been whether the gender type, prestige, and interest of occupations are similarly important to young people, and thus whether compromises in these dimensions are more or less consequential. Gottfredson stated that individuals generally seek to protect their visible, social selves more than their more private psychological selves, “at least until later in life” (2002, p. 103). More specifically, she suggested that, in the stage of compromising, young people are most concerned with their public presentation of gender; protecting their social standing is less of a concern. This, in turn, ensures that the fulfillment of interests and personality through an occupation is least important to them (Gottfredson 2002, p. 89). Empirical research on the types of compromises young people make in the process of occupational choice has not supported this proposition (Blanchard and Lichtenberg 2003; Hirschi and Vondracek 2009; Junk and Armstrong 2010; Wee 2014). Studies have shown that interest is either as important as the two social dimensions (Hesketh et al. 1990) or even more important (Blanchard and Lichtenberg 2003; Junk and Armstrong 2010).

In contrast to Gottfredson’s model, considerations from the P-E-fit theory have explicitly addressed the three dimensions’ relative importance in the workplace, and their predictions are in line with previous research. The P-E-fit theory has distinguished three different types of fit, which were expected to affect job satisfaction (and thus the risk of premature VET termination) differently: needs-supply fit, ability-demands fit, and supplementary fit (see Fig. 1, right panel, for illustration) (Edwards and Shipp 2012). (1) Direct negative effects were expected when an individual’s subjective needs and the supply of those needs in a particular VET occupation diverge, negatively affecting a *needs-supply fit*. Two other aspects of P-E-fit were expected to have indirect effects via the needs-supply fit: (2) the degree of fit between a person’s abilities and demands in terms of education, experience, workload, and occupation-specific tasks. This *ability-demands fit* increases both extrinsic and intrinsic job rewards and thus serves to satisfy a person’s needs. Furthermore, occupational demands can be internalized and thus become a need. (3) *Supplementary fit* describes the degree of similarity between a person and other individuals in the environment in terms of values, goals, personality, or demographic characteristics. This fit can serve as supply for the needs for affiliation and belonging, and satisfies the needs for closure and clarity (Edwards and Shipp 2012).

As visualized in Fig. 1, we apply these considerations to the three dimensions of compromise, integrating Gottfredson’s theory of circumscription and compromise (Gottfredson 2002) and the P-E-fit theory (Edwards and Shipp 2012). The fit between occupational interests and the interest profiles of occupations directly corresponds to the needs-supply fit (Fig. 1, blue arrow). After entering VET, trainees are confronted with the question of whether the tasks and activities associated with the realized occupation create personal satisfaction. For the first time in their lives, the fit between their occupational interests and the interest profile of their VET occupation becomes salient to them. Thus, compromises in interests should be highly consequential with regard to the risk of premature VET termination. This assumption is supported by research highlighting the importance of matching vocational interests for career success (Nye et al. 2012; van Iddekinge et al. 2011; Volodina et al. 2015).

The gender type and prestige of an occupation emphasize public, social aspects of the self (Gottfredson 2002). In this sense, the fit between aspired and realized occupational

gender type and prestige are both facets of supplementary fit (Fig. 1, lower red and green arrows). According to P-E-fit theory (Edwards and Shipp 2012), a misfit between aspired and realized occupational gender type and prestige leads to a higher risk of premature VET termination only if a strong fit in these aspects fulfills needs of affiliation and/or clarity. Because not all trainees have the same need for affiliation, the effects of gender type and prestige misfit on premature VET termination are likely to be smaller than that of interests.

Compared to a mismatch in gender type, a mismatch in prestige may have an additional indirect impact on the risk of premature VET termination (Fig. 1, upper red arrow). On the one hand, this is the case when the VET occupation is more prestigious than the occupation aspired to, as more prestigious occupations usually impose higher demands. This discrepancy might imply a lower ability-demands fit. Since this type of misfit reduces both the intrinsic and extrinsic rewards of VET in the form of approval from the trainer or grades, the needs-supply fit might further decrease, resulting in an additional risk of premature VET termination. On the other hand, a mismatch in terms of lower prestige implies as well lower ability-demands-fit, just like more prestigious occupations, but its psychological effect is ambiguous. Some trainees might feel unchallenged and bored and therefore be less satisfied overall, others might feel more competent, because they perform better, get better grades and therefore be more satisfied overall (Michaelis and Findeisen 2022). More importantly, a mismatch in terms of lower prestige might violate the need for maintaining the social status of one's family of origin, which according to a large stock of research is an important driver of educational aspirations and decisions (Stocké 2007; Becker and Hecken 2009). If this is the case, this type of mismatch affects the needs-supply-fit, which again implies an additional indirect impact on the risk of premature VET termination.

**H3:** Taken together, these considerations imply that compromises in interest profiles matter most for the risk of premature VET termination; compromises in occupational prestige should be less relevant, and compromises in gender type should have the smallest effects.

This study also pays attention to the fact that gender type, prestige, and occupational interests do not develop independently of each other, because occupations are fixed bundles of these characteristics (Henderson et al. 1988; Hesketh et al. 1990; Junk and Armstrong 2010). For example, prestige is closely related to gender type because female occupations are located in a narrow range in the middle of the occupational status hierarchy (England 1979; Härkönen et al. 2016; Magnusson 2008). Such occupational structures are also recognized in adolescents' process of occupational choice when occupational interests develop through social evaluations of occupations based on gender type and prestige (Gottfredson 2002; Hesketh et al. 1990; Steinritz et al. 2016).

Due to the institutionalized recruitment processes in the training market, young people only have a limited number of occupational alternatives available to them, and gender type, prestige, and interest cannot be combined arbitrarily. Compromises emerge as specific patterns across the singular dimensions (Schels et al. 2022). Therefore, it is likely that young people who cannot realize their realistic occupational aspirations make compromises not only in one dimension, but in several dimensions simultaneously. Therefore, we assume that although the individual effects of the compromise indicators are

weaker when the other dimensions are taken into account simultaneously, the relative importance of the three compromise indicators assumed in H3 remain.

## Methods

### Data and analysis sample

We tested our assumptions using longitudinal data from the German National Educational Panel Study, Starting Cohort 4 (NEPS-SC4) (Blossfeld and Rossbach 2019; NEPS Network 2021). The NEPS is carried out by the Leibniz Institute for Educational Trajectories (LifBi, Germany) in cooperation with a nationwide network. NEPS-SC4 drew on a representative sample of 15,006 grade 9 students in regular secondary schools in Germany in the fall of 2010. Panel data from (semi-)annual follow-up interviews was available up to 2019.

Within this sample, we had to exclude 10,020 students who did not enter VET in firms or vocational schools during the observation period and/or who did not provide valid information on their realistic occupational aspirations. Additionally, we dropped 1,067 persons who left school after grade 9, because most students in this group had already applied for VET and received an acceptance or rejection by the time their occupational aspirations were measured for the first time. Therefore, their responses to occupational aspirations are not comparable to those of students who left school later. A further 403 exclusions were due to implausible information on education and VET. In addition, we excluded 208 persons with missing information on occupational dimensions. Finally, we excluded 67 persons for whom there was no valid information on the imputation variables. The final analysis sample consisted of 3,241 young people who left school at grade 10 or later, who expressed a realistic occupational aspiration while at school, and who started VET within the observation period.

### Measures

The dependent variable is premature termination of the first VET episode. We differentiated between trainees who prematurely terminated VET and those who successfully completed VET. Individuals who were still in VET during the observation period or who dropped out of the panel study after starting VET were included in the analyses as right-censored cases. In our sample, 13% of VET episodes were terminated prematurely, 53% were completed successfully, and 35% were right-censored.

Compromises in occupational gender type, prestige and interests were the central independent variables for our analysis. Compromises were measured by comparing the first VET occupation with the realistic occupational aspiration from their school days. The realistic occupational aspiration was measured by the open-ended question: *“Consider everything you know right now. What will probably be your occupation in the future?”*. For students in lower and intermediate secondary school tracks (German *Hauptschule* and *Realschule*) who left school after grade 10, we used the measurement in grade 9. For students in upper secondary school tracks (German *Gymnasium*), who left school after grade 12 or 13, we used the realistic occupational aspirations measured 1.5 years before leaving school. We used the occupation of the first VET after leaving school to measure the preliminary end point of the compromise formation. We included all forms of school-based and dual training that lead to a recognized vocational qualification. In the NEPS data, both respondents' realistic occupational aspirations and their

VET occupations were coded according to various occupational classifications, which enabled us to merge them with aggregated occupational data from different external data sources.

Compromises in gender type were measured by comparing the share of employees of the same gender in the first VET occupation and in the realistic occupational aspiration. These shares were obtained from the German Microcensus (Research Data Center of the Federal Statistical Office and Statistical Offices of the Federal States 2008, 2009, 2010), a representative survey of 1% of German households on their working and living conditions (pooled data from 2008 to 2010), based on the first three digits of the International Standard Classification of Occupations (ISCO-88). Compromises for a more (or less) gender-typical occupation are defined if the same-gender share of the first VET occupation is at least 10% points higher (or lower) than the person's realistic occupational aspiration.

Compromises in prestige were measured by comparing the first VET occupation and the realistic occupational aspiration in terms of their scores on the Magnitude Prestige Scale (MPS). The MPS is a measure of the social prestige of occupations, developed specifically for the German occupational hierarchy based on representative occupational assessments (Becker and Blossfeld 2017; Wegener 1992). The scale ranges from 20 (unskilled worker) to 186.8 (judge). As the occupational aspirations and VET occupations are already coded according to the MPS in the NEPS data, it was not necessary to resort to external data sources. Compromises for a more (or less) prestigious occupation are defined if the MPS score of the first VET occupation is at least 10 points higher (or lower) than the person's realistic occupational aspiration.

Compromises in occupational interests were measured by comparing the VET occupation and the realistic occupational aspiration from the school days in terms of their interest profiles according to the RIASEC typology (Holland 1997). Following a procedure described by Ertl and Hartmann (2019), we linked the RIASEC typology provided in the US-based O\*Net (2020) to the occupations in our data based on the ISCO-08. We then generated the dichotomous first-letter agreement index (Holland 1963) by comparing the first RIASEC letter of the occupational aspiration with the first RIASEC letter of the VET occupation. The first RIASEC letter is the most representative for the characterization of an occupation and a deviation from it represents a significant compromise.

We controlled for characteristics that are likely to affect both occupational compromises and premature VET termination. This was the case for socio-demographic characteristics such as gender and region of residence (East/West Germany). We also controlled for the highest socioeconomic status of the parents, as indicated by the International Socio-Economic Index of Occupational Status (ISEI), and for migration background, distinguishing between young people who were either born abroad themselves (first generation) or had at least one parent who was born abroad (second generation). The proxies for educational attainment were the trainees' highest school degree before entering VET - here, we distinguished between low (no degree or lower secondary degree, *Hauptschulabschluss*), medium (intermediate secondary degree, *Realschulabschluss*) and high (university entrance diploma, *(Fach-)Hochschulreife*) qualifications. We also used the trainees' grades in the last year of school in mathematics and German, ranging from 1 (*very good*) to 6 (*very poor*). Finally, we controlled for two personality traits that are relevant in our context, conscientiousness and neuroticism.

To reduce potential bias caused by item nonresponse on the control variables, we implemented multiple imputation with chained equations (MICE) based on a large set of predictors. In addition to the variables used in the models, we included further information reported by the students about whether they had access to books at home to help them with their homework and whether they had a desk at which to study. We generated five complete datasets (van Buuren 2018). A description of all variables can be found in Table S1 in the supplementary material file.

### Statistical procedures

To examine how compromises in gender type, prestige, and interests affect the risk of premature VET termination, we used event history modeling. Event history modeling allows us to deal with right-censored data. Episodes begin with the start of the first VET after leaving school and end with one of the following events: premature termination of VET, completion of VET, or censoring. The process time is right censored if the trainee is still in VET at the final available wave of NEPS or is no longer observed due to panel mortality. In these cases, event history models allow us to make use of the information that the first VET continued until the end of the observation. We thereby use all available information to estimate covariate effects. We estimated hazard rate models for discrete time with a logistic link function (Rabe-Hesketh and Skrondal 2022) because it is particularly well suited to processes that are not only measured discretely, but are also discrete in nature (Singer and Willett 2003). It is known from statistics on VET contracts that most trainees who terminate VET prematurely do so in the first year; later terminations are rare and happen at all points in time (Bundesinstitut für Berufsbildung 2023, p. 146). Therefore, the observation period was split into three discrete time intervals (up to 12 months, 13 to 24 months, 25 to 42 months). The hazard rates were assumed to be constant within each interval.

To test our first two hypotheses (H1a-c, H2) on the effects of compromises in gender type, prestige, and interest profile on the hazard of premature VET termination, we estimated models that each included one compromise indicator (M1-3). To test our hypotheses about the strength of the compromise dimensions (H3, H4), we estimated a model that included indicators of compromise in gender type and prestige (M4) and a model that included all indicators of compromise jointly (M5). We report coefficients of the covariate effects and average marginal effects (AME) on the hazard rate. The AME facilitate the comparison of effects across different model specifications (Mood 2010). In order to substantiate the relative impact of the three compromise dimensions, we supplement findings from a dominance analysis.

## Results

### Occupational compromise and premature termination risk

We examined whether trainees who made compromises during the transition from school to VET differ in their risk of premature VET termination. We first investigated the three compromise indicators separately. The results showed, in line with Hypothesis 1a, that a compromise in gender type was associated with an increased risk of premature VET termination (M1, Table 1). No support was found for Hypothesis 1b, which predicted an increase in premature VET termination for trainees who compromised in

**Table 1** Determinants of premature VET termination (discrete hazard models)

	M1		M2		M3		M4		M5	
	$\beta$	AME	$\beta$	AME	$\beta$	AME	$\beta$	AME	$\beta$	AME
Compromise in gender type (Ref.: no compromise)										
less typical	0.582*** (0.157)	0.004** (0.001)					0.566*** (0.164)	0.004** (0.001)	0.402* (0.164)	0.003* (0.001)
more typical	0.266 (0.143)	0.001 (0.001)					0.271 (0.155)	0.001 (0.001)	0.113 (0.156)	0.001 (0.001)
Compromise in prestige (Ref.: no compromise)										
less prestigious			0.128 (0.135)	0.001 (0.001)			-0.030 (0.147)	-0.000 (0.001)	-0.309* (0.158)	-0.002 (0.001)
more prestigious			0.310 (0.172)	0.002 (0.001)			0.141 (0.177)	0.001 (0.001)	-0.062 (0.182)	-0.000 (0.001)
Compromise in interests (Ref.: no compromise)										
t1: 1–12 months	-6.256*** (0.599)	-0.037*** (0.006)	-6.083*** (0.591)	-0.036*** (0.006)	0.651*** (0.133)	0.004*** (0.001)	-6.240*** (0.599)	-0.037*** (0.006)	0.686*** (0.155)	0.004*** (0.001)
t2: 13–24 months	-7.079*** (0.561)	-0.041*** (0.006)	-6.913*** (0.555)	-0.040*** (0.006)	-6.240*** (0.599)	-0.037*** (0.006)	-7.069*** (0.561)	-0.041*** (0.006)	-6.291*** (0.601)	-0.037*** (0.006)
t3: 25–42 months	-7.272*** (0.557)	-0.043*** (0.006)	-7.118*** (0.552)	-0.042*** (0.006)	-7.248*** (0.558)	-0.043*** (0.006)	-7.264*** (0.557)	-0.043*** (0.006)	-7.289*** (0.561)	-0.043*** (0.006)
Control variables	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Person-months	81,596		81,596		81,596		81,596		81,596	
Persons	3241		3241		3241		3241		3241	

Sources: NEPS SC4 SUF 12.0.0, Microcensus 2008–2010, National Center for O\*NET Development, own estimations; Notes:  $\beta$  = coefficients of the covariate effects, AME = Average Marginal Effects; Significance levels: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , standard errors in parentheses; controls: highest school qualification, last school grades (mathematics, German), personality traits (conscientiousness, neuroticism), parents' highest socioeconomic status (ISEI), gender, residential region, migration background; for the complete table including the effects of control variables see Table S2 in the supplementary material file

prestige (M2, Table 1). Finally, a compromise in the interest profile was again associated with a higher rate of premature VET termination, confirming Hypothesis 1c (M3, Table 1).

In our second hypotheses, we postulated that compromises towards less gender-typical occupations would increase the risk of premature VET termination more than compromises towards more gender-typical (H2a) and compromises towards less prestigious occupations would increase the risk of premature VET termination more than compromises towards more prestigious occupations (H2b). The results showed that trainees in occupations that were *less* gender-typical than their aspired occupation were more likely to end VET prematurely than trainees who did not compromise in gender type. In contrast, compromises towards *more* gender-typical occupations were not significantly associated with a higher premature VET termination rate (M1, Table 1). These findings supported Hypothesis 2a. As there were no significant associations with prestige (M2, Table 1), there was also no support for Hypothesis 2b.

In our third hypothesis, we expected that the strength of the effects would differ between compromises in the three dimensions. We assumed that compromises in interests would be most relevant to the risk of premature VET termination, compromises in occupational prestige would be less predictive, and compromises in gender type would have the smallest effects. To test this, we examined the main effects of the different compromise indicators net of the other compromise indicators in Model 5 (Table 1). As expected, the effects of compromises in interest were strongest, followed by slightly smaller effects of compromises towards less gender-typical occupations, while compromises towards more gender-typical occupations had no effect. Entering less prestigious or more prestigious VET occupations than initially aspired to did not significantly affect premature VET termination, net of compromises in the other two dimensions. Hence, the empirical analyses partially supported Hypothesis 3.

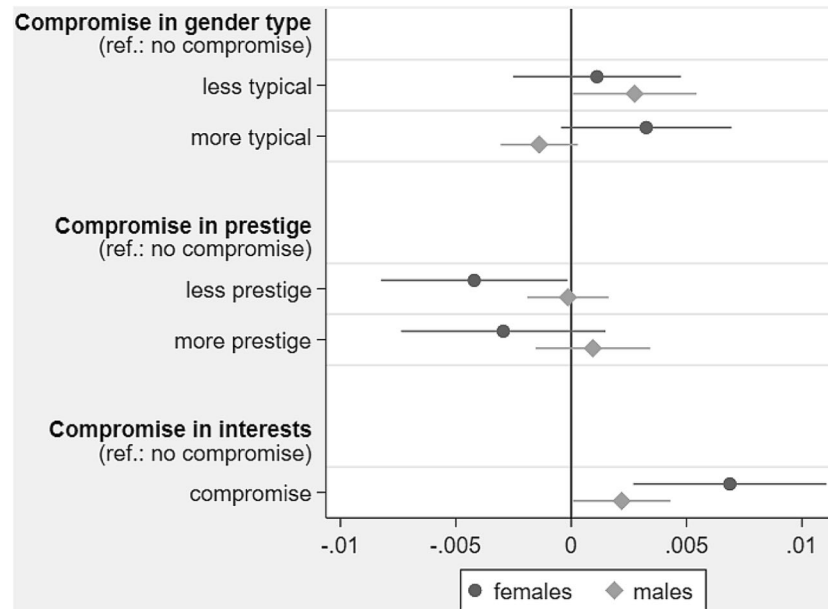
Next, we take into account that the occupational dimensions are assumed to be inter-related. Bivariate correlations between the compromise indicators revealed medium to strong associations between compromises in interests and prestige (Cramer's  $V=0.54$ ), compromises in interests and gender type (Cramer's  $V=0.44$ ), and compromises in gender type and prestige (Cramer's  $V=0.35$ ). Thus, compromises in the three dimensions often went hand in hand, but were not completely congruent. We examined whether the individual effects of the compromise indicators on the risk of premature VET termination were diminished when the other compromise indicators were also taken into account. The results showed that compromises in gender type remained quite stable when simultaneously controlling for compromises in prestige (M4, Table 1). After adding the indicator for compromises in interest (M5, Table 1), the effect of compromise in gender type (less typical) lost strength, while the effect of compromise in interest remained stable. In both models, M4 and M5, the effects of compromises in prestige remained insignificant. A potential problem of multicollinearity in the multivariate analysis could be ruled out due to the low variance inflation factor (VIF) of 1.25 (M5).

We further evaluate the influence of compromise indicators on the likelihood of premature VET termination, as estimated in Model 5, using dominance analysis (Azen and Budescu 2006; Luchmann, 2021). Table 2 reports the relative rank of the variables and the standardized dominance statistic, which represents the average net increase in the R-squared of the model obtained by adding the compromise indicator to the model

**Table 2** Ranking of compromise indicators in determining premature VET termination (dominance analysis)

	std. dominance est.	rank
Compromise in gender type	0.193	2
Compromise in prestige	0.105	3
Compromise in interests	0.702	1

Sources: NEPS SC4 SUF 12.0.0, Microcensus 2008–2010, National Center for O\*NET Development, own estimations; Notes: std. dominance est.: average net increase in  $R^2$  constructed using all subsets of other compromise indicators, controls: highest school qualification, last school grades (mathematics, German), personality traits (conscientiousness, neuroticism), parents' highest socioeconomic status (ISEI), gender, residential region, migration background



**Fig. 2** AME of compromise in gender type, prestige and interests on premature VET termination by gender. Sources: NEPS SC4 SUF 12.0.0, Microcensus 2008–2010, National Center for O\*NET Development, own estimations; Notes: Controls: highest school qualification, last school grades (mathematics, German), personality traits (conscientiousness, neuroticism), parents' highest socioeconomic status (ISEI), gender, residential region, migration background; see also Table S3 in the supplementary material file

constructed using all possible subsets of the other predictors. This allows us to evaluate the impact of the compromise indicators while holding the control variables constant. The results support the findings presented in the previous sections that compromises in interest exhibit the greatest potential to improve the explanatory power of the model. Compromise in interest accounts for about 70% of all the information in premature VET termination explained by compromises and, thus, has a greater impact than compromises in gender-type (19%) and, in the last place, compromises in prestige (11%).

#### Heterogeneous effects by gender

In addition, we tested whether the consequences of compromises for premature VET termination differed for male and female trainees. We addressed this issue by replicating Model 5 for males and females separately. Figure 2 shows the resulting gender-specific AME of compromises in gender type, prestige, and interest on the risk of premature VET termination.

The results showed that compromises towards less gender-typical occupations had negative effects only for male, but not for female trainees. Compromises towards more

gender-typical occupations were not significant for either group, but differed significantly between them. Compromises in prestige were a relevant factor for female, but not for male trainees. Entering a VET occupation that was less prestigious than the occupation aspired to had a stabilizing effect on VET participation among young women. Compromises in interests increased the risk of premature VET termination for both genders. This effect was particularly strong for women.

#### **Sensitivity analysis for compromise indicators**

The categorical compromise indicators used in the analysis reflect that adolescents may cross crucial boundaries in terms of gender type, prestige, and interest profile when they enter a VET occupation other than the one to which they initially aspired to. Because there are no clear assumptions in the literature about the threshold at which adolescents experience a noticeable compromise, we tested the sensitivity of our results by estimating models with alternative thresholds for compromises in gender type and prestige. Here, we distinguished between moderate compromises of 10 to 20 (30) prestige points or percentage points in same-gender share and larger compromises (>20 (30)). The results are presented in Tables S4 and S5 in the supplementary material file.

The models with differentiated thresholds for compromises in occupational gender type reveal patterns of effects similar to those in our main models. More specifically, the alternative specifications indicate that the destabilizing effect of a compromise toward less gender-typical occupations is driven primarily by the group of trainees who started VET occupations with a moderately lower gender type, and not by those who had started clearly less gender-typical VET occupations.

The differentiated thresholds for compromises in prestige indicate that the relationships between compromises in prestige and premature VET termination are even more complex. When not controlling for other compromise dimensions, strong compromises towards less prestigious VET occupations were associated with a higher termination rate; moderate compromises towards less prestigious VET occupations even had a stabilizing effect (Tables S4 and S5 in the supplementary material file, M2). The stabilizing effect of moderate prestige compromises on the risk of premature VET termination proved even stronger when controlling for compromises in interest profiles (Table S5 in the supplementary material file, M5).

#### **Discussion and conclusions**

Our research, based on a sample of entrants into vocational education and training (VET) in Germany, generated novel findings on the consequences of occupational compromises in gender type, prestige, and interest for premature VET termination. First, we showed that trainees who entered a VET occupation that differed in terms of gender type or interest profile from their realistic occupational aspirations from school days were at increased risk of terminating their first VET position before graduation. Compromises in prestige were not a significant factor for premature VET termination overall.

Second, only entering a *less* gender-typical VET occupation significantly increased the risk of premature VET termination, while entering a *more* gender-typical occupation did not. These findings are in line with previous research on the consequences of entering less gender-typical VET occupations (Beckmann et al. 2023). We argue that our result suggests, first of all, that the P-E-fit theory is a useful extension of Gottfredson

(Gottfredson 2002), providing precise arguments for why the functional form of compromises in gender type makes a difference. The need for same-gender affiliation and social belonging does not seem to be sufficiently fulfilled when entering a *less* gender-typical VET occupation and therefore leads to premature VET termination. Our sensitivity analyses showed only for young men that entering a less gender-typical VET occupation compared to their realistic occupational aspiration from school days was associated with a higher risk of terminating VET prematurely. Women in our analysis seemed to be less affected. This would imply that entering a less gender-typical VET occupation is more threatening to men's need for affiliation and social belonging in their occupational environment. Entering a *more* gender-typical occupation than aspired does not seem to affect all entrants in the same way, so that we do not observe any effects overall. Taken together, these effects may also help to explain the persistence of occupational gender segregation in the German labor market (Bächmann et al. 2024). In terms of prestige, we did not find different effects depending on whether compromises were made in favor of a more or less prestigious occupation. Entering a relatively *more* prestigious occupation may not place greater demands on the individual, as the realized occupations are still within the young people's realm of ability. Entering a relatively *less* prestigious occupation also did not affect the need for status maintenance, perhaps because the realized prestige was within the acceptable prestige boundaries of the adolescents. Our sensitivity analyses suggested that compromises in prestige have more complex implications for premature VET termination. For female trainees, entering less prestigious VET occupations led to more stable vocational training than for those who entered training occupations at the aspired prestige level. Since this emerged independently of compromises in interest and gender type, one explanation could be that young women's need for status maintenance was not threatened by entering relatively less prestigious occupations. Women may find other advantages in less prestigious occupations, such as compatibility with social and family life.

Third, our study illustrates the *relative* importance of occupational gender type, prestige, and interest after entry into the first VET. Gottfredson (2002) assumed that people are most protective of their social selves - particularly their preferred occupational gender type - during the process of career choice. In contrast, we found that compromises in interest have a particularly destabilizing effect on premature VET termination. Drawing on the P-E-fit theory (Edwards and Shipp 2012), we argued that trainees experience compromises in interests in VET as a direct undersupply of needs, which may have various implications - it may increase conflicts, prompt lack of integration or lack of performance, or lead to a combination of these. That is why compromises in interests become particularly salient at this stage. Entering less gender-typical occupations than aspired to is less relevant. This result supports our assumption that compromises in gender type have only an indirect effect. Not all trainees seem to have the same need for affiliation that is unfulfilled by a compromise. Prestige does not seem to be relevant either.

Fourth, as other authors have already argued (e.g., Hesketh et al. 1990; Junk and Armstrong 2010) we conclude that we need to better address the question of how occupational gender type, prestige, and interest profiles relate to each other. Although compromises in interest and gender type had an independent influence on premature VET termination, our findings also showed that aspects of the social self and interests were interrelated, e.g., the effects of gender type compromises were partly explained by

interest compromises. We conclude that the opportunity structures in the VET market provide fixed occupational bundles in terms of gender type, and interest profiles. Certain compromises are therefore more likely than others and do not occur in arbitrary combinations.

### **Implications for theory and practice**

Our research extended the understanding of how compromises in the process of occupational choice have lasting consequences in working life - for example, for the first vocational training. There are several implications that can be drawn from our findings. First, Gottfredson's (2002) theory of circumscription and compromise is an approach that is also suitable as a basic theory of the consequences of compromises in occupational choice. This approach explains how occupational aspirations develop and change in terms of the dimensions gender type, prestige and occupational interests in the form of compromises. Our study goes beyond this by examining the consequences of unfulfilled occupational aspirations in the context of previous compromises. In line with Gottfredson's expectations, our findings demonstrated that the realistic occupational aspirations formed in school seem to be a key reference for trainees that continues to affect them in later stages of occupational choice. We demonstrated this for VET entrants who were in the consolidation phase after making their first occupational choice. They were faced with the crucial question of whether to complete their VET or to terminate it prematurely if their training occupation did not match their aspirations.

Our findings also have practical implications for how trainees are expected to respond to limited opportunities for realizing their occupational aspirations formed in school. This is particularly important because premature termination is regarded as a problem of efficiency losses in the VET system. Advisors in training firms and vocational schools as well as career counselors are therefore expected to provide potential VET entrants with more information about specific occupations, to become more aware of their occupational interests, and to critically compare them with the task profiles of available VET occupations. Nevertheless, our results also suggest that career counselors should analyze young people's occupational interests against their social selves and adopt a gender-sensitive perspective.

### **Limitations and future research**

There are several limitations to the data and methods used in our study. First, we have not uncovered detailed mechanisms that explain how the compromise dimensions analyzed ultimately lead to premature VET termination or stabilize VET in certain constellations. Our findings suggest that not every mismatch between occupational aspirations and VET occupations creates problems in the VET environment, such as dissatisfaction. Future research could examine more explicitly how compromises translate into premature VET termination.

Second, since our findings are based on the case of Germany, which has a highly specific VET system, it would be interesting to determine how these findings can be transferred to other countries. Many young people in Germany enter the working life through the mainly market-based VET system, which is highly occupation-specific and strongly linked to future occupational opportunities. School leavers in Germany make these choices at a relatively young age, especially those who are not eligible for tertiary

education. This restricts their choices in the initial transition to VET and has implications for possible reorientations afterwards. Thus, transitions - and with them the processes and consequences of compromises - may be comparable in countries with similar VET systems, such as Austria, Denmark, or Switzerland. In many other Western countries, VET is either school-based or post-school education is mainly acquired at university, which implies different entry restrictions, broader qualification profiles, less need to make highly occupation-specific choices and fewer consequences for labor market chances. However, our findings on occupational compromises in terms of gender type, prestige, and interests might affect young people's early labor market success in other countries in the same way as VET does in Germany, given that VET serves as an entry-level labor market in Germany (Holtmann et al. 2017). Overall, these considerations might be a fruitful starting point for future replication studies and comparative research.

### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40461-024-00168-y>.

Supplementary Material 1

### Acknowledgements

Earlier versions of this paper were presented, among others, at 7th International VET Congress in Bern (2022) and the 4th Crossing Boundaries Conference in Vocational Education and Training in Muttenz and Bern (2021). We wish to thank all participants for their helpful comments and suggestions.

### Author contributions

Data Curation: MF-B, LA, CK. Formal Analysis: MF-B, LA, BS. Conceptualization/ Methodology/ Validation/ Writing – Original Draft Preparation: MF-B, LA, CK, BS. Visualization: MF-B, LA. Funding Acquisition/ Investigation/ Project Administration/ Resources/ Supervision: CK, BS.

### Funding

This research was funded by the German Research Foundation (381212222, "Finding compromises and its consequences – path dependencies between occupational choice, educational decisions, and training pathways"; see: <https://gepris.dfg.de/gepris/projekt/381212222?language=en>).

### Data availability

The data underlying the results presented in this study come from a variety of sources with different access requirements. (1) This paper uses data from the National Educational Panel Study (NEPS; Blossfeld & Roßbach, 2019). The NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi, Germany) in cooperation with a nationwide network. The basic requirement for any access to NEPS data is the conclusion of a Data Use Agreement with the Leibniz Institute for Educational Trajectories. Further information on data access, including application forms and instructions for filling application forms, can be found at <https://www.nepsdata.de/Data-Center/Data-Access/Data-Use-Agreements>. (2) In addition, the paper uses data from the German Microcensus 2008–2010. These data can be obtained from the Research Data Center of the Federal Statistical Office. In order to work with the microcensus data, it is necessary to conclude a contract for data use. Further information on data access can be found at: <https://www.forschungsdatenzentrum.de/en/access>. (3) In addition, the paper uses data from O\*NET are publicly available at <https://www.onetcenter.org/database.html#all-files>.

### Declarations

#### Competing interests

The authors declare that they have no competing interests.

Received: 30 December 2023 / Accepted: 16 July 2024

Published online: 29 July 2024

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