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Institutional adult education regimes: Continuing vocational education and training participation and barriers in Germany, Sweden, and the United Kingdom

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Abstract

This study investigates continuing vocational education and training (CVET) in three institutional contexts: Germany, Sweden, and the United Kingdom. Drawing on PIAAC Cycle 1's unique questions and transparency, we analyse institutional regimes and socio-economic gradients in CVET participation. Barriers to and engagement in CVET is embedded in educational, labour market, and welfare state institutions. Results show that Sweden's universal-collectivist regime fosters the highest participation with minimal disparities, while Germany's corporatist regime shows lower participation and higher stratification. The UK's liberal-individualist model exhibits moderate participation but sharp socio-economic inequalities, emphasising financial and employer-related barriers. Resource constraints such as time and money are prominent barriers across institutional contexts. Our exploratory measurement of CVET interest opens pathways for future research that was not thought possible with existing PIAAC data. These findings contribute to long-term institutional analysis and theory, and inform policy interventions to reduce barriers, increase interest, and support disadvantaged groups.

Keywords: continuing vocational education and training, skill formation regimes, institutional theory, PIAAC data

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Introduction

Economic success is often defined by the level of economic output in a society. The most common measure being the value of all goods and services produced in a country in a year, e.g., Gross Domestic Product (GDP). Cross-national research demonstrates that the cognitive skills of the workforce statistically explains most of cross-national GDP variation (Hanushek & Woessmann, 2008). This correlation supports a theoretical perspective that skills, knowledge, and capabilities of the workforce are causal inputs driving economic growth, perhaps more than any other factor. This is theoretically justified, because human skills are rewarded with higher incomes, keep firms competitive, reduce the likelihood of unemployment and generate a larger tax base for further economic investment by the state (Busemeyer & Trampusch, 2012; Saar et al., 2013; Thelen, 2004; Vélez-Coto et al., 2021).

As a result of the Digital Revolution, and dominating economies' transition to services and technology, skills are rapidly obsolete in many labour market segments. Firms seek employees with more up-to-date skills to remain innovative and profitable. This means that skills acquired in formal schooling and initial vocational training are not guarantors of long-term labour market success for individual workers. For individuals in dynamic skill sectors, career advancement rather than stagnation depends on continuing vocational education and training (CVET) (Bassanini, 2006), and workers that want to change sectors require major skill updating (Li, 2024). With such high vested interests in their skill development, workers should be continually motivated to seek CVET. Yet research demonstrates this varies greatly by society and depends on the institutions in place to support (or hinder) training participation (Crouch, 1992; Lischewski et al., 2020; Thelen, 2012). Therefore, understanding institutional training landscapes – what we will refer to as regimes here – is crucial to understanding CVET within and between countries.

This study investigates rationally driven motivations to train and how these link to institutional regimes. We expect different institutional 'packages' in each society shape levels of CVET participation over time, including differences in participation along socio-demographic lines. Regime is a catchall concept for the social, economic and political institutions of a given country that hinder or favour different training opportunities, demands and motivations. The institutional logic of training is well known. Studies often observe institutional patterns of GDP, CVET participation and stratification in income and intergenerational mobility (Brunello & Rocco, 2017; Hanushek & Woessmann, 2012). We aim to add the experiences of workers into our knowledge base, as these are a key part of rational decision-making processes embedded in institutional regimes. Using representative surveys, we investigate how individuals perceive and interact with barriers to CVET participation. This is an emerging area of institutional knowledge (see, for example, Massing & Gauly, 2017; Rubenson & Desjardins, 2009), and one that helps disentangle arguments about the agency of individuals, and to what degree this is conditioned by institutional context (Souto-Otero, 2013).

Our framework combines existing sociological and political economy theories of institutional regimes with theories of adult learning based in bounded agency and more critical perspectives from andragogy and transformative learning. These theories help us to both model and interpret the complexities of CVET participation behaviours. We select Germany, Sweden and the United Kingdom as our country-case studies. Our cases reflect a critical trichotomy in institutional theories of societies, economies and politics: Germany as corporatist-collectivist, Sweden as universal-collectivist and United Kingdom as liberal-individualist. We use data from the *Programme of the International Assessment of Adult Competencies* (PIAAC) survey with a question measuring the

participation in and perception of barriers to CVET and a range of socio-economic status variables, some only publicly available in the first Cycle of PIAAC (around 2012).

Institutions, adult learning, and CVET

A country's institutional context consists of interlinked social, political and economic domains (Jepperson, 1991). *Institution* is a dynamic concept and a contested term. Despite disagreements, Hodgson (2006) concludes that divergent institutional theories share a basic definition of institutions as 'systems of *established* and *prevalent* social rules that structure social interactions' (p. 2, emphasis added). Infrastructure, normative behavioural expectations, government intervention strategies, formal education, labour market policies, the relationship of employers and the state, wage setting and bargaining power, and social policies, are all aspects of institutional regimes for example (Breznau, 2023; Hall & Taylor, 1996)[1].

Government intervention and coordination are crucial building blocks for an institutional *regime* – a collective package that shapes individual productivity, including the demands for and provision of initial vocational education and training (IVET) and thereafter CVET. In the following, we thus speak about 'institutional contexts' holistically using the concept of *regime*. Although the data we analyse provides only a single year snapshot, it is worth emphasising that the effect of a country's institutions shaped the lifecourses to date of most individuals responding to that survey. Thus, with our snapshot we are peering into the history and likely future of the somewhat stable collective skill formation regimes.

In the case of CVET, adult learning and motivations to learn are important aspects of our theory of regimes. By incorporating these, we expand the typical sociological and political economy institutionalist approach to include theories of adult learning. This is a newly emerging subfield that we might label 'adult learning systems' following Desjardins and Kalenda (2025) or simply an 'adult learning institutionalist' theoretical framework. An integrated theory will ideally enable comparison of population-representative quantitative knowledge at the individual-level with, what is essentially qualitative and theoretical knowledge about meso- and macro-level institutions that define the realities of individuals' preferences, actions and constraints (Rubenson & Desjardins, 2009; Schrader, 2008). This framework is reflexive – it emerged during our production of findings, and after reflecting upon those findings[2].

Theories of welfare state regimes, collective skill formation and varieties of capitalism are well established (Busemeyer & Trampusch, 2012; Esping-Andersen, 1989; Estévez-Abe et al., 2001; Hall & Soskice, 2001). Their explanations are useful for framing social inequality, social security, economic productivity and human capital and how these link to regime-configurations of states, firms and labour. Often missing from these frameworks are theories of adult learning. Admittedly several of these subfields do not, or did not originally deal with adult learning or even vocational education (Desjardins & Ioannidou, 2020; Rubenson & Desjardins, 2009). But, as many of the aforementioned authors argue: They are inseparable. Social norms, political systems, and how to engage in economic productivity are learned within regimes. An individual's agency and ability to influence others depends on learning and continually learning about the interlinked social-economic-political aspects of their society. Individuals will have agency, the ability to decide and act, and boundaries to this agency, direct rules or restrictions or perceived likelihoods of behavioural outcomes that then shape decision making. Therefore, applying an agentic perspective within institutional regimes demands that we think about how and why adults learn (Boeren, 2016; Merriam, 2017): meaning the

attitudes, values, perceived cost-benefits and learned habits that they have that make them more or less likely to learn; and furthermore how these are more or less constrained by structural features (e.g., Jarvis, 2014; Knowles, 1978; Rubenson & Desjardins, 2009), i.e., the policies, laws, political and economic systems, and etc., that define regimes.

We attempt to summarise our combined institutional framework based on its levels of analysis. At the **micro-level**, CVET decisions follow cost-benefit calculus but bounded by resources and support (bounded agency) and driven by frameworks and frame switching that can sometimes suddenly alter the perception of costs and benefits. For example, both Weber's value-rationality and critical adult learning theory would predict that adults engage when learning is relevant and aligned with their goals, but prior experiences and current social, familial or otherwise scripted frames shape their confidence and interest, thus moderating when they perceive that learning is relevant, all else equal. Moreover, even if individuals are intrinsically motivated, their agency is bounded by funding, time, employer support and other structural factors that link to the meso- and macro-levels through their cognitive perceptions and internalized social mores (Lischewski et al., 2020; Rüter et al., 2020).

At the **meso-level**, families, communities, networks and workplaces mediate adult educational participation. Care or work responsibilities can impose time or resource constraints. Organisational environments influence learning, based on the intersection of industry- and employer-specific structures and macro-level labour market policies (Boeren et al., 2023). At the **macro-level** opportunities, incentives, and cultural values regarding CVET are reinforced through policies and collective identities. Costs and benefits of adult learning are heavily influenced by the size of public social safety nets, and how these stratify by socio-economic status (see review in Roosmaa & Saar, 2017). Skill formation systems shape whether CVET is normatively and practically more or less a collective responsibility or an individual (market) good. These systems which form the basis of regimes over time, are shaped through myriad interdependent factors such as training leave laws, tax breaks, active labour market policies, access to training institutions and lifelong learning initiatives (Rubenson & Desjardins, 2009).

In the proceeding study we cannot capture all complexities of institutional and adult learning theories to explain CVET participation and barriers at all three levels. It is far too complex, and the theories contain sometimes competing mechanisms. This is a strength – we can simultaneously have different explanations for observed outcomes – but also a weakness – we do not have the technology or theoretical coherency to choose specific theorised causal processes over one another.

Regime case selection

We select Germany, Sweden, and the United Kingdom as institutional adult learning regimes with key similarities and differences. Similarities are that all three had relatively stable educational and vocational training systems throughout their histories for as long as most survey respondents were adults, they have the highest level of CVET participation in Europe (Roosmaa & Saar, 2017), and they are all rich western democracies with reasonably high skilled economies.

As we discuss in the following, the similarities of these three countries become tenuous when comparing their regimes: welfare states (Esping-Andersen, 1989), political economies (Hall & Soskice, 2001), and skill formation institutions (Busemeyer & Trampusch, 2012; Culpepper & Thelen, 2008; Estévez-Abe et al., 2001; Gallie, 2007; Willemse & de Beer, 2012). The PIAAC Cycle 1 data we use has responses from around 2012, thus our time window is after the Great Recession (after 2008) but prior to the

COVID-19 Pandemic (2020 onward). This time window provides a strategic data point, as the Pandemic constitutes a global event that renders a period of peculiarity that could bias attempts to compare longstanding institutional effects on human decisions.

Germany's unique institutional configuration has a conservative-corporatist social welfare state, coordinated market economy, and collective skill formation. A strong IVET system based in formal, upper-secondary education with substantial employer involvement (firm-based apprenticeships, dual system) which generates specific skills (Estévez-Abe et al., 2001). Because of school system standardisation and state quality assurance, employers can rely on credentials as signals for certain vocational skills (Allmendinger, 1989; Thelen, 2004), which should reduce immediate needs for CVET upon labour market entry. However, Germany's strong employment protection, high level of corporatist-cooperation, and a relatively stable workforce, should facilitate CVET because firms have incentives to continuously invest in workers. Yet, post-2008-Crisis policies in Germany focused more on preventing job loss (for instance, through state-subsidised short-term work arrangements) as opposed to offering CVET (Heyes, 2012). Although Germany is among countries with the highest CVET participation in the world, it tends to have lower participation rates than other rich Western societies (Vaculíková et al., 2024). Early tracking and performance differentiation in the education system more or less stratify individual labour market chances (Allmendinger, 1989; Eichhorst et al., 2015). Higher labour market segments have higher skill requirements and in turn offer better and more secure working conditions, higher wages and more CVET opportunities. Consequently, differences in CVET should be substantial to the *disadvantage of individuals from lower socio-economic status*.

Sweden also has coordinated market institutions and is a prototypical social democracy with universal welfare state provisions. The education system is inclusive providing more equal chances, as it does not track students from an early age like Germany. IVET is predominantly organised in secondary schooling. Due to strong unions, employers are more distant from vocational education than labour and the government (Busemeyer, 2009). The rather unstandardised IVET components of formal education generate more basic and general skills. It is only after labour market entry that employers invest in the necessary industry- or firm-specific skills that workers need, yet, generous state financial support and strong employment protection facilitate and safeguard these investments (European Centre for the Development of Vocational Training, 2009). Also, as a consequence of the Great Recession, the government substantially increased spending on education and training in 2009 (Heyes, 2014). This, coupled with the long-standing tradition of adult education (*folkbildning*), results in *high overall CVET participation* with *differences between socio-economic status groups expected to be the lowest.*

The **United Kingdom** stands in stark contrast to Germany and Sweden. Economic action is competitive under liberal market mechanisms; state involvement is less. A comprehensive formal education system generates predominantly general skills without much IVET. Occupation- and firm-specific skills are obtained directly on-the-job (Thelen, 2004). Thus, *overall CVET is expected to be relatively high*, but without universal access it should be lower than in Sweden. In a high turnover labour market, employers are reluctant to provide CVET, as they cannot assure trained workers will stay long enough to recoup their investments; to remain competitive workers need to train on their own accord. Yet, as the UK labour market is segmented, CVET participation is expected to be *substantially different between socio-economic status groups*. The highly skilled segment requires adequate skills, thus competitive firms provide their workers with opportunities for CVET. In contrast, skill requirements in other industries

(particularly traditional manufacturing and the lower service sector) are low, especially due to the automation of production processes (Harcourt & Wood, 2007). Thus, predominantly less-educated individuals in lower status jobs are highly disadvantaged in CVET access (Bukodi, 2017) and firms have low incentives to train them. Socio-economic differences are reinforced because provision of CVET is largely privatised, and thus most beneficial to already socio-economically advantaged individuals. CVET is more readily available and affordable for those with means than in other countries where the state and employers are providers but also CVET market gatekeepers.

Barriers to CVET

In this study we seek to identify the impact of institutions on individual efforts to obtain CVET and any decisions associated with these efforts. This is in a way the strongest test of institutional theory, because if institutions really are as embedded, descriptively consistent and pervasive as one would expect to justify classifying them as a regime, then their impacts should be visible in the daily lives of individuals – not only in macro socioeconomic indicators. This follows a bounded rationality perspective where institutions shape the information, time and risk constraints for individual decisions, and we should be able to detect the differences resulting from different regime-specific narrowing of the choices available or imaginable for individuals.[3]

We identify individual resources and their scarcity as potential barriers to the desire, and the ability to actualise this desire, to participate in CVET. As any form of education, CVET participation requires investments such as time and money including opportunity costs (Becker, 1962). Thus, lack of time and insufficient finances are barriers to CVET participation (Siegfried et al., 2019). Here, different institutional configurations of the state, firms and families (and their interrelations) may counteract or intensify these resource constraints. This renders it difficult to identify one specific resource or factor as a barrier mechanism. Under bounded rationality, state, firm, and family supports do not merely offset costs, they shift the decision environment frame – i.e., how individuals think about the costs and benefits of training. The point is that the same individuals would make different choices in different institutional frameworks, or in the same institutional framework if they had different socio-economic attributes (education, occupation, etc.).

Long ago, Cross (1981) differentiated between dispositional, institutional, and situational barriers. Time and money can be all three, in the sense that perceived lack of money or time would be dispositional compared to an objective lack of time or money which is situational. If institutions support potential participants in CVET by freeing them from work or providing financial means, then barriers are institutional. From a perspective of bounded rationality, time, money and the perception of lack of time or money are structural constraints because they are real constraints from the perspective of the individual even if they 'misperceive' something that is not actually an objective constraint: like that a course would cost too much when in reality it is offered with free tuition. Regimes create the rationality frame used to make the cost-benefit analysis or determine if it is possible to engage in CVET. This cannot be fully disentangled because we cannot measure pure objective or subjective reality, neither among institutions nor individuals, and need to consider these as boundary conditions (Rubenson & Desjardins, 2009). Put differently, respondents self-reporting will reflect structurally bounded agency. This is why welfare-regime differences should reflect barrier profiles in adult learning reported in surveys.

Multi-level governance and employers interact in the process of providing resources for CVET. Workers, regardless of the institutional context or their socio-economic status,

can perceive themselves as too busy for CVET. Yet, employers can support their workers by allowing them to train during working hours or (temporarily) freeing them from certain work responsibilities (Rüter et al., 2020). This willingness to provide time for CVET is related to its cost, which again is linked to the role of the state in providing education and training. If CVET is strongly funded by the state, employers should be more willing to support it (Thelen, 2004) this enables rational calculations favouring decisions to participate in training assuming individuals are in jobs with such employers, hinting that state investment with the goal of providing training for all who need it can inevitably increase training (decision) stratification as in the case of Germany. A critical adult learning theoretical lens would flag the equity trade-off because access to employer-brokered training is mediated by occupational power and credentialed status, and resources (or policies to remove barriers) can reproduce (dis)advantage unless coupled with rights-based entitlements that democratise participation (Lundvall & Rasmussen, 2016).

Sweden provides essentially universal, free CVET, thus employers should encourage all workers to take advantage of this. Moreover, lack of employer support should not discourage individuals; for instance, workers are legally entitled to take unpaid leave for CVET purposes (Schömann, 2002). *Barriers should be weak,* and *hardly depend on socio-economic position in Sweden*. The downside risks of CVET are offset, thus 'unbounding' the rational choices individuals can imagine making. In direct contrast stands the UK. As the education system mostly provides general skills, specialisation on-the-job is necessary. Yet, in the liberal market economy, the state and employers are rather reluctant to provide CVET or the respective resources necessary, even though they may consider CVET beneficial. Thus, *barriers to CVET are more consequential in the UK*. Also, *socio-economic differences should be larger* given a largely privatised market with less support for those facing resource constraints. This should be particularly true in high-skilled industries, where employers may incentivise individual CVET investments, while in low-skilled occupations employers may see no need for supporting CVET. At the same time, liberalised markets cultivate individualistic attitudes toward training responsibility, such that individuals may have more motivation to seek CVET because they know it is unlikely to be provided for them. A critical perspective should caution about the use of a term like 'choice' here as liberal regimes might mask structural lack of choice, because fees and time costs are privatised, so that agency is an illusion couched in structural exclusion of lower-SES adults from CVET.

In contrast stands Germany, where firms focus their efforts on providing specific skills in a strong, vocationally oriented apprenticeship system, thus less on CVET. However, because of strong employment protection legislation, employers are interested in worker skill development (Saar et al., 2013), and thus may provide more resources, be it time or money for CVET purposes. Additionally, many jobs are highly regulated in occupational ordinances (*Berufsordnungen*), which often prescribe mandatory CVET. Taking these points together, the *impact of CVET barriers in Germany would be at an intermediate level* (less than in the UK, more compared to Sweden), yet with *considerable socio-economic differences in the effect of barriers on CVET*. Support flows more to labour market insiders in Germany leading to high information and switching costs that constrain rational choices. This couples with employers' rational decisions to invest in CVET for the most qualified employees and those working in skilled positions, which disadvantages individuals in lower SES status jobs.

Second, caring for children or family members impacts available resources, particularly time, and should thus reduce CVET participation. However, these responsibilities are embedded in country-specific institutional settings that may buffer

their relevance as a barrier. The extent of welfare state provision and de-/familisation of policies may counteract the effect of scarce resources differently in the three countries (see discussion in, for example, Arévalo-Iglesias, 2025), which in turn impacts CVET participation.

Taking family and labour market policies, Sweden consistently has the most female- and thus family-friendly regulations, whereas Germany ranks much lower but still faring slightly better than the UK (Lohmann & Zagel, 2016). Besides universal and generous childcare and family policies, Sweden also represents the dual-earner model (Huber & Stephens, 2000). Thus, *Sweden may be most effective in counteracting resource constraints for all socio-economic groups and thus facilitating CVET despite care responsibilities*. Irrespective of recent reforms in Germany that aimed at boosting comprehensive state-provision of childcare, this responsibility still is primarily in the hands of women. The liberal welfare state in the UK does not feature strong care policies, and thus facilitates privatised, market-like child- and family care options (Lewis, 1992). Thus, care obligations, especially paired with insufficient availability, should *restrict available resources and pose a barrier to CVET participation in these two countries*. Particularly *lower status individuals will be affected to a higher degree*, as they cannot afford to hire private care services or to have one parent staying out of the labour market.

Clearly, CVET participation is a complex process that is both facilitated and constrained by different resources and actors, and these barriers are empirically hard to disentangle. Analysing their role in the CVET context is nonetheless critical for further theoretical and policy-oriented knowledge, especially for those whose needs and interests are not (sufficiently) met. But to know if interests are met, it is necessary to consider first *interest* itself as a potential barrier. Those not interested in training will not face 'conventional' barriers, because they are intrinsically not interested – they do not need time or money to train, it is not something on their agenda. This is crucial from a bounded rationality perspective because rational decision-making among individuals requires an impetus, an input to drive the behaviour. Without interest there is no grounds for individual motivation. However, asking an individual if they are not interested, can capture at the same time their own cost-benefit calculus which is a cause of disinterest. 'I am not interested' could mean they already know they cannot afford it or do not have time, but otherwise might want to train. The institutions of a regime cultivate more or less interest via lifelong learning norms, and indirectly shape interest through objective barriers such as time and money. Both bounded rationality and critical adult learning theory converge here. The former implies disinterest could be a rational proxy for unaffordable options, while critical theory reminds us that interest is socially constructed by those whose learning is legitimised, funded, and made visible in everyday life, e.g., higher status 'learners'.

The German welfare state and educational system is geared toward status maintenance. Analogous research on intergenerational and individual status mobility demonstrates that Germany restricts rather than enables fluidity of class and status (Hertel & Groh-Samberg, 2019). This means lifelong learning norms in Germany work against CVET participation, because individuals will have lower mobility and upskilling expectations when compared to similarly rich and higher-skill labour force regimes. Sweden has a 'social partnership' regime (common in Nordic countries) where the state supports and steers, but prioritises individual development and expression (including in unions and firms), unlike Germany where a 'statist' system prioritises state leadership which can push goals onto the corporatist partners (Prokou, 2008). From a bounded rationality perspective this Swedish regime should enable lifelong learning norms, as they are developed across the lifecourse without tracking restriction. Finally, the UK should

indirectly cultivate lifelong learning norms, because individuals are less reliant on the state. Their sense of a need to be individually competitive for labour market access within a 'voluntary partnership' system, that leaves much of the training decisions and support up to individuals, firms and other agencies on a voluntary rather than state mandated basis, is cultivated from an early age as a norm. This again points at Germany as having the highest lack of interest due to weaker lifelong learning norms, despite massive investment and coordination in CVET.

Data and methods

Data

We draw on national *Programme of the International Assessment of Adult Competencies* (PIAAC) 'Cycle 1' samples for Germany, Sweden, and the UK (Public Use Files)[4]. In 2011/2012, the Organization for Economic Cooperation and Development (OECD) conducted the PIAAC survey in 24 industrialised countries with around 5,000 participants aged between 16 and 65 per country; each sample represents the working age population, and it assesses adult proficiency in literacy, numeracy, and problem-solving skills in a technology-rich environment (OECD, 2013). There is a second cycle of PIAAC data for 2022/23 but it is not suitable for conducting our analysis because the values for the occupational status variables (ISCO08_C and ISCOSKIL4) are withheld for data protection reasons, *and* the CVET and barriers questions were changed to the point that they are not comparable (ROA & GESIS, 2025).

Outcome variable

The PIAAC background questionnaire provides substantial information on 'organised learning activities [that respondents] participated in during the last 12 months, including both work and non-work related activities' (OECD, 2010, p. 23). A 'yes' answer indicated participation in any of the following: 'Courses conducted through open or distance education'; 'Organised sessions for on-the-job training or training by supervisors or co-workers'; 'Seminars or workshops'; 'Courses or private lessons not already reported'. They were also asked to assess whether the activity was mainly job-related.[5] This information was combined to construct a dichotomous variable to measure CVET participation (i.e., NFE12JR).

Main independent variables

Barriers to CVET are measured via a skip pattern question, 'In the last 12 months, were there any learning activities you wanted to participate in but did not?' (OECD, 2010, p. 32). If respondents agreed, they were asked 'Which of the following reasons prevented you from participating in education and training? Please indicate the most important reason'. Given the complex nature of barriers and the interplay of resources and actors previously outlined in our paper, it is unfortunate that respondents could only indicate the most important reason. Immediate resource constraints are represented by 'I was too busy at work', 'something unexpected came up' (both refer to time/timing and we combine them into the barrier variable *time*) and 'Education or training was too expensive/I could not afford it' (*money*). Then, 'Lack of employer's support' (*support*) and 'I did not have

time because of childcare or family responsibilities' (*care*) represent barriers, which arise from the interplay of different actors.[6]

Socio-economic status is measured by level of education and occupational status. For the former, we distinguish two levels based on the International Standard Classification of Education: tertiary (ISCED 5 and 6) and non-tertiary (ISCED 4 and below) education; for the latter, we code three categories based on the first-digit of the *International Standard Classification of Occupations* (ISCO-2008) as contained in the variable ISCOSKIL4 which is pre-coded by the PIAAC team: professionals (major groups 1-3), non-manual (major groups 4-5) and manual occupations (major groups 6-9) (Erikson et al., 1979). For analytical purposes we also construct a socio-economic status (SES) indicator for 'HIGH' and 'LOW' defined as professional and tertiary educated versus non-tertiary and manual.

Controls

We include sex, age, age-squared, and presence of children. The employment situation is captured by contract type (permanent, temporary, no contract), scope of employment (full-time, part-time, marginal), public versus private sector employment and type of industrial sector (based on a reduced version of the *International Standard Industrial Classification*). Descriptive statistics and correlations are in Appendix Tables A1 and A2.

Sample restrictions

We analyse respondents in paid employment and exclude unemployed individuals and those in formal education. Given different school-to-work transition regimes (Brzinsky-Fay, 2007) and (early) retirement policies (Fasang, 2010) in the countries under study, we limit the analyses to individuals aged 25 to 55 to ensure comparability of prime-aged worker populations.

Methods

The first step of the analysis assesses within- and between-country differences in CVET participation. We estimate logistic regressions on the pooled sample using all controls and country-interactions with the socio-economic status variables plus country dummies; a second model adds the presence of CVET barrier interacted by country. As sensitivity tests, we conduct country-specific analyses to crosscheck for compositional differences.

For the second step, we attempt to account for potential selection bias from those who lack interest being less likely to participate in CVET. As PIAAC does not directly ask about CVET interest, a proper selection model (e.g., a Heckman selection model) is not possible. Reporting a barrier implies CVET interest; as does actual participation without reporting a barrier, thus confounding direct measurement.[7] The question 'In the last 12 months, were there any (more) learning activities you wanted to participate in but did not?' asks respondent to 'Include both activities that lead to formal qualifications and other organized learning activities' (OECD, 2010, p. 32), thus covering any potential CVET courses. With this question we can measure *interest* in participation in more learning activities than a respondent had participated in. This leaves one category relatively unambiguous: those who reported not wanting more training and who do not participate in any training. They are assumed to genuinely have *no current intrinsic interest in* CVET. Those who participated in CVET but are not interested in more, might have had their interest fulfilled, or might not be interested at all but had to train for work.

Thus, our measure becomes speculative. However, we note that those who trained rarely, less than four times in the last 12 months, could have easily had time to take more courses. We thus code this group as also genuinely not interested when they report no interest. Our decision to use this exploratory measurement technique is substantiated by a few facts: 1) those who participate in more courses are more often interested in more training, suggesting no clear 'interest-fulfilling' effect of participating in more training; 2) those who lack interest (because they do not want to participate in any/more courses) are much more likely to report that they 'do not like learning new things' suggesting that this does measure a lack of general learning interest, and 3) our innovative measurement of lack of interest correlates with liking learning new things, CVET participation and the number of courses (see Appendix Fig. 1A). Although not confirmatory evidence, these are strong statistical justifications for using our measurement.

We then estimate logistic regressions predicting this lack of interest using the same independent variables as Step 1. The variable gives us a pseudo-selection model[8] from which we infer that those who are *not* uninterested are instead in some way interested, and we then restrict the sample to only those interested. Although this is biased toward lower socio-economic status participants, it is equally biased in each country. And it thus helps us understand how barriers and socio-economic status play out for those who intrinsically want to train – as best as we can measure them. Finally, we estimate logistic regressions on the restricted sample of those we deem to be interested in CVET to assess socio-economic differences in the impact of barriers on CVET given intrinsic interest. All regression results are presented in two formats: as average marginal effects (AMEs) interpreted as the predicted change in the likelihood of the dependent variable with a one-point change in a given independent variable, and predicted marginal likelihoods (PM) which indicates the predicted rate of the dependent variable in a population for each given category of an independent variable. The key difference is that PMs are results when all else is equal – the values of the other variables are at their means – and AMEs are unique to the population – the values of the other variables are at their actual values observed in the survey and the treatment for a given independent variable is manually manipulated across the population to simulate an experimental treatment in the population.

Reproducibility and workflow

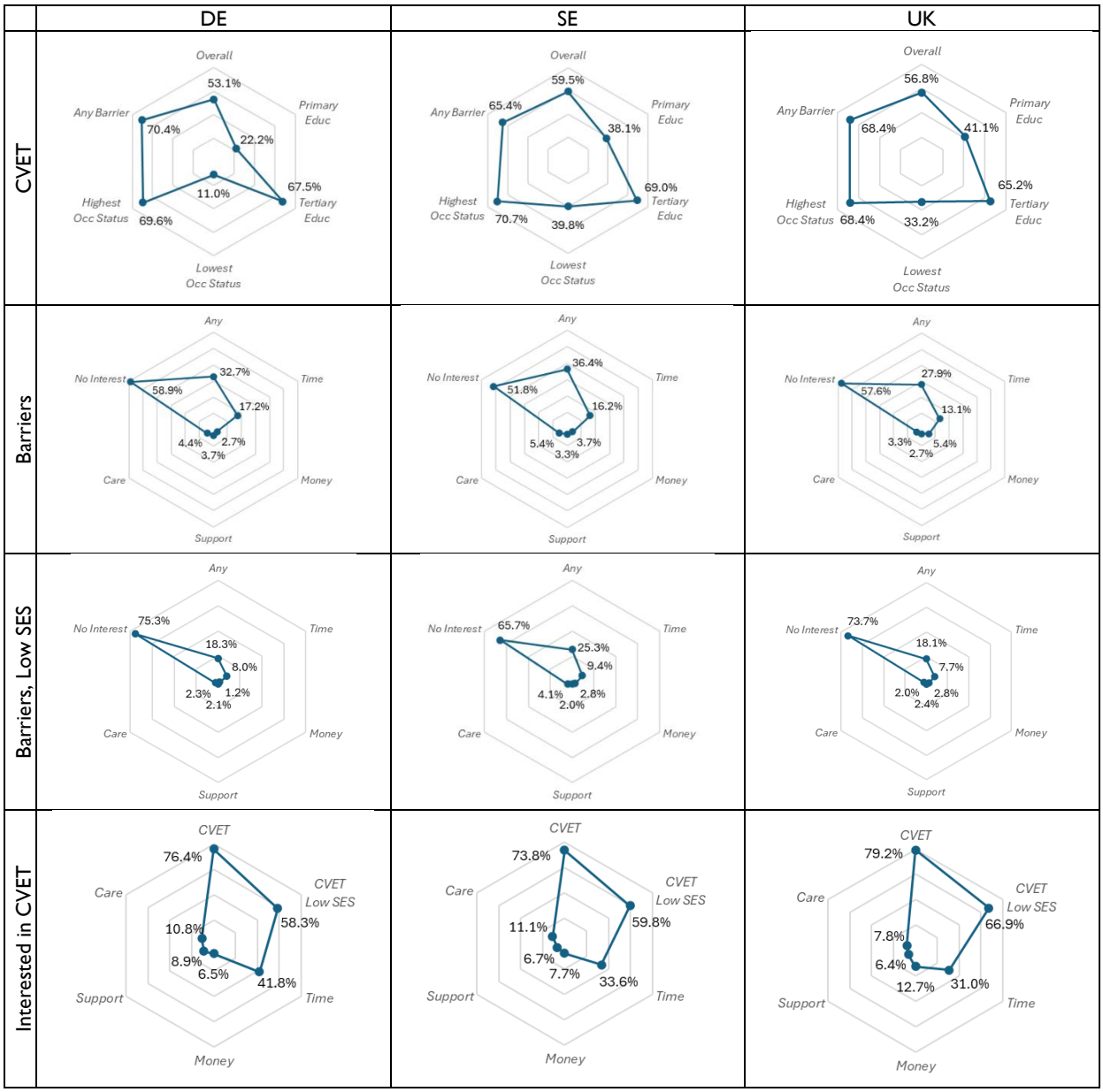
Our Online Repository has the entire workflow in Stata (Breznau, 2026), with support for visualisations from Excel. The data are analysed descriptively with weights using the Stata *piaactools* ado-file (Jakubowski & Pokropek, 2019) and analytically with *svyset* (StataCorp, 2025) and the native-PIAAC population weighting variables (SPFWT*). Support for quickly finding all variables, question wording, and response was provided by the PIAAC Variable Finder (Breznau, 2025).

Results

Demographic descriptions of the samples from the three countries are relatively similar (see Appendix Table A1). Just over 50% are male and mean age is just above 40. Some notable differences are that professional occupations in Sweden (highest ISCO category of four) account for 50.4% of the labour force, while Germany (40.7%) and the UK (42.9%) are roughly 10 percentage points lower. The percentage with a tertiary education in the UK is highest (44.6%), part of its general skill-oriented liberal regime. Whereas Germany (36.2%) and Sweden (37.3%) are lower, as they offer options for those finishing secondary school to develop skills in vocational tracks or on-the-job.

When it comes to CVET, incidence among working-age adults in the labour force differs by country as shown in Figure 1 (and Appendix Table A1). It is lowest in Germany (53.1%) with its strong IVET system, and highest in Sweden with its comprehensive, well-funded CVET landscape (59.5%). The UK is in between (56.8%) despite high demand via education and labour market institutions and respective policies, but presumably fuelled by the private secondary market for CVET and possibly strong intrinsic learning norms and/or needs. The stratification difference is most noticeable in Germany. Here those with a primary education or less and in a blue-collar occupation (22.2% and 11.0% respectively) train very little in comparison to Sweden (38.1 and 39.8%) and the UK (41.1 and 33.2%).

Figure 1. Participation and barriers to participation in Continuing Vocational Education and Training (CVET) across the three countries



Notes. Authors' own calculations. Population aged 25-55 in the labour force, weighted using *piaactools*.

The incidence of CVET participation despite reporting a barrier diverges markedly between countries. Training is highest in Germany among those reporting a barrier at 70.4%. This suggests that barriers in Germany are not as constraining as in Sweden (65.4%) and the UK (68.4%). Looking at barrier reporting, the picture both clarifies and diversifies aspects of the regime-training landscapes. The highest rate of reporting of any barrier to participation in CVET is in Sweden at 36.4%, whereas this is lowest in the UK at 27.9 and in the middle in Germany at 32.4%. This high reporting in Sweden is undoubtedly a product of Sweden having the lowest lack of interest in training at 27.9% with the UK and Germany notably higher at 34.4 and 37.2% respectively. It is easy to speculate that because Sweden makes training so universally available, that individual interests in training are much higher, independent of the labour market demands. This alone could explain a higher incidence of barrier reporting as well.

Breaking down barriers by type, Figure 1 shows country-specific prevalence for the full sample ('Barriers' row), those who are secondary educated or less and in a blue-collar occupation ('Barriers, Low SES' row) and those we infer to be intrinsically interested in CVET ('Interested in CVET' row). Of all barriers, time is most frequent; however, time-based barriers were more than one response category: being too busy at work, courses at an inconvenient time and something unexpected coming up. None the less, the prevalence of any time-based barriers is more than three times any other barrier. Time is extremely important in preventing participation. Germany (17.2%) and Sweden (16.2%) have the highest incidence of reporting one of a time-based barrier, with the UK lower at 13.1%. As respondents could only chose the most important reason for missing a course, we cannot compare raw rates easily as they are co-dependent on reporting of the other barriers. Of those who are 'low SES' (not-tertiary educated and blue-collar work), the reporting of a time barrier is less stratified and at much lower rates.

Financial constraints differ considerably by country. The money barrier is highest in the UK at 5.4% roughly double Germany's 2.7%, with Sweden in between at 3.7%. Thus, financial resources and the costs associated with CVET weigh more in the UK's privatised market. Lack of employer support is higher in Germany and Sweden (3.7 and 3.3%) and much lower in the UK (2.7%). This could simply reflect that money is more important in the liberal UK regime but could also signal how important employers are as gatekeepers in more statist/corporatist regimes. Care of children or family members as a barrier is highest in Sweden (5.4%). It is possible that Germany's more traditional gender roles lead to less dual career households, and more often allow for one primary care parent. Again, Sweden has the highest training participation and barrier reporting, thus all measures are respectively higher. In Sweden lack of interest is lowest at 51.8% – we assume this indicates strong lifelong learning norms in this regime. This is much higher in the UK (57.6%) and Germany (58.9%) although barrier variation suggests this might be for different reasons, in the UK money and in Germany time and lack of employer support. However, reporting of a barrier is only done for those who report they want more training, therefore, intrinsic interest also plays a key role on its own.

Turning to multivariate analysis, the regression models presented in Table 1 Model I below (with odd-ratios and sensitivity analyses in Appendix Table A3) reveal socio-economic differences underlying CVET participation. Tertiary-educated individuals have 6.2% (AME=0.062) higher CVET chances than their less-educated counterparts on average in all three countries (*Model 1*). Looking at the country-specific interactions shows that educational differences are largest in Germany where tertiary educated are 7.2% more likely to participate than non-tertiary educated. This likelihood is smaller in the UK at 5.3% and not clearly significantly different from zero in Sweden. In all countries, differences by occupational status are even more pronounced; compared to un-

/low-skilled occupations, individuals in higher skilled professional jobs are 24.4% more likely to participate in CVET on average. In Germany the professional (high skilled) advantage in CVET is highest at 28.4% more likely with rates in Sweden (19.6%) and the UK (16.8%) similarly lower. This gradient is repeated for non-manual (white collar, moderate skilled) occupations with a 16.8% higher likelihood in Germany, which is roughly double that in the UK at 8.2% and there is no significant difference in Sweden. The Swedish regime has suppressed training disadvantage the most by occupation and education.

Table 1. Average marginal effects of education, occupational status, and presence of CVET barrier on CVET participation, by country

	Pooled		Germany (DE)		Sweden (SE)		United Kingdom (UK)	
Model	1	2	1	2	1	2	1	2
Tertiary education[1]	0.062***	0.047**	0.072**	0.053*	0.024	0.020	0.053*	0.042
Occupational status[1]								
Non-manual	0.129***	0.119***	0.168***	0.149***	0.047	0.050	0.082**	0.085**
Professionals	0.244***	0.221***	0.284***	0.240***	0.196***	0.186***	0.187***	0.168***
Barrier		0.161***		0.188***		0.063**		0.136**

Notes. PIAAC 2012, ***p<.001; **p<.01; *p<.05; †p<.10. Model 1) Presence of barrier not included; Model 2) Presence of any barrier included in the model. AMEs taken from logistic regressions (see Appendix Table A3) controlling for male, age, age^2, children, scope of employment, contract type, and public sector with country-interactions in one model, using jackknife estimation with replicate weights (svyset & spfwt*). In Model 2, SES AMEs include Barrier effect. Unweighted N = (DE) 2,931, (SE) 2,374 and (UK) 4,562.

[1] Reference categories: non-tertiary education; manual occupation

Model 2 in Table 1 above adds the presence of a CVET barrier into the analysis. In all three countries measuring whether a barrier was reported suppresses the gradients in socio-economic status in CVET participation. This means that individual and institutional barriers are responsible for some of the inequality in CVET participation, net of other important variables. Interestingly barriers in Germany predict much higher participation 18.8%, versus Sweden at 6.3% and the UK at 13.6%. This is why we need to adjust for intrinsic interest. Because of the way barriers are measured in PIAAC we simultaneously measure an impact of barriers that is negative (participation preventative) and positive (a proxy for interest).

Thus, the second analysis identifies the selection effect of individuals not interested in CVET, as shown in Table 2 (odd-ratios and sensitivity analyses in Appendix Table A4). Those in tertiary education are less likely to be not interested (10.0% less on average across countries) and this is nearly identical in all three regimes with the UK being slightly higher at 11.1% compared to Germany and Sweden at 9.4 and 9.1%, respectively. There is also lack of interest stratification by occupational status that is very pronounced in Germany with non-manual being 9.4% less and professionals 22.2% less likely to be not interested than blue-collar workers. In Sweden and the UK professionals are only 13.2% and 14.8% respectively less likely to be interested. Importantly there are no significant differences between non-manual and blue-collar occupations on average in Sweden and the UK. Because measuring a lack of interest requires that participants do not report a barrier, we cannot analyse the role of barriers here – they are collinear on the barrier reporting side.

Table 2. Regression predicting lack of CVET interest, average marginal effects of education and occupational status, by country

	Pooled			DE			SE			UK		
Variable	AME	95% CI		AME	95% CI		AME	95% CI		AME	95% CI	
Tertiary education[1]	-0.100***	-0.134	-0.066	-0.094***	-0.144	-0.045	-0.091***	-0.139	-0.042	-0.111***	-0.162	-0.060
Occupational status[1]												
Non-manual	-0.068**	-0.108	-0.028	-0.094***	-0.150	-0.040	-0.011	-0.074	0.052	-0.035	-0.094	0.025
Professionals	-0.190***	-0.224	-0.155	-0.222***	-0.271	-0.173	-0.132***	-0.190	-0.074	-0.148***	-0.206	-0.090

Notes. PIAAC 2012, ***p<.001; **p<.01; *p<.05; †p<.10. AMEs from pooled logistic regression with country-specific interactions (Online Appendix Table A4) controlling for male, age, age^2, children, scope of employment, contract type, and public sector, using jackknife estimation with replicate weights (svyset & spfwt*). Lack of interest defined as those who participated in 3 or less courses in the last 12 months and answered 'No' to the question 'In the last 12 months, were there more learning activities you wanted to take part in but did not? Include both learning activities that lead to formal qualifications and other organised learning activities', see Appendix Figure A1 for measurement validation. Unweighted N = (DE) 2,931, (SE) 2,374 and (UK) 4,562.

[1] Reference categories: non-tertiary education and manual occupation

Our final step is to perform a sample correction and analyse CVET participation only for those we infer are interested in training. Table 3 below (odd-ratios and sensitivity analyses in Appendix Table A5) shows these results using both AME (1st columns and predictive margins (PM, 2nd columns). There are no AMEs for the group that does not report any barrier because this is the baseline and all AMEs are relative to this group.

For individuals who do not report a barrier (top rows), the gap in CVET likelihood between low and high SES is considerable in all three regimes. It is most pronounced in Sweden (almost 20 percentage points: 94.8% for high versus 75.8% for low) and lower in the UK and Germany (roughly 15 and 14 percentage points respectively). The highest predicted incidence of training when there is no barrier present for those interested in training occurs in the UK speaking both to the restrictive nature of barriers in this liberal regime and the importance of interest, as a barrier, in motivating individual decision-making. Sweden appears counterintuitive at first, but there is a difference that is hidden in the collapsed SES categories. Namely, that manual occupations in Sweden are far less likely to train (72.1%) than in other occupations within Sweden and less than manual workers in Germany (77.4%) and the UK (81.1%). Without barriers Sweden has higher CVET stratification for those interested in training, this is not the case for those reporting barriers as we will see. However, these predicted margins take other variables at their means, reflecting that occupation is a strong training predictor in Sweden (the largest manual/non-manual/professional gradient).

Turning to treatment effects, the time barrier has the least overall impact at -17.2% CVET likelihood in Germany, with Sweden and the UK similarly higher at -21.0 and -20.3%, respectively (AMEs). Those reporting a time barrier train the most in the UK (PM of 74.2%). This can be interpreted as those with a time barrier being more likely to train for other reasons (AME), despite the predicted likelihood (PM) which assumes those other reasons do not exist. The gradient here is very different across regimes. In Germany, high SES individuals have almost no predicted reduction in CVET likelihood from a time barrier (-9.0%) in comparison to low SES (-24.9%), whereas in Sweden this is almost identical for low and high SES (-20.6 and -22.0%, respectively) and in the UK the pattern flips, where time is more constraining for high SES (22.4%) than low (12.2%). This could be interpreted as Germany having codified training ladders that support insiders with consistent schedules, employer support (and paid training leave rights), while lower SES individuals may have inconsistent schedules, multiple jobs and other familial roles that

prevent them (Käpplinger, 2022; Van Nieuwenhove & De Wever, 2022). It could reflect evidence of Sweden's universal impact of barriers, here time. The UK 'reversal' could reflect selection of those who are highly motivated and training despite reporting barriers – after all, a liberal regime puts the highest burden on the individual to overcome challenges (time is most commodified) and high SES individuals have jobs with higher time demands.

The money barrier is acute as a treatment effect reducing CVET likelihood from 23.5% (Germany) to as much as 34.8% (UK). It is not surprising that the money impact is so high in the UK, again given its market-driven, private training landscape. Germany facing the lowest treatment effect of a money barrier reflects that training in Germany is likely paid for or very low cost, and therefore the reporting of a money barrier is rare (2.7%, see Fig. 1) but if present it is a unique and highly impactful barrier, as stratification is extreme with low SES 58.1% less likely to participate in CVET, compared to just 20.1% for high SES. The gap for money in Sweden is less pronounced at -42.1 and -30.2% respectively, similar to the UK at -43.2 and -25.1% respectively, again despite a large overall effect. However, looking again at manual occupations, money barriers reduce CVET likelihood in Germany by 52.4% which is one of the two largest AMEs in the table (they have an overall likelihood of training of 16.4% only). The lower status occupations in Germany are by far the most disadvantaged within Germany and this disadvantage is the most acute of all three regimes.

Lack of employer support has a tremendous impact in Sweden at -38.7% and only a moderate effect in Germany (-16.4%) and the UK (-19.2%). This runs through the very high-status occupations being 54.6% less likely to participate in CVET if reporting a support barrier, this is the other largest AME in the table. It highlights a range of potential explanations. Sweden offers a right to unpaid training leave, but high-status occupations may be so labour intensive that this is not an option without employer support. The corporatist structure of Sweden puts a lot of power into unions, but in high status occupations the role of firms may still dominate unions because of extra-high profit and pay incentives. The state plays only a supporting role. Germany and the UK have completely different training landscapes, but employer support is only marginally restrictive as a socio-economic gradient when it comes to participation in CVET.

Finally, as assumed, facing care responsibilities significantly reduces CVET for individuals from low socio-economic status, specifically for less-educated workers. The care barrier is most detrimental in the UK and Germany. Sweden does not appear to have much of a socio-economic gradient in SES, but looking at education specifically this appears. The predicted margins here, like with the money barrier, show a huge within-country gradient in Germany and the UK. This means that the other factors that lead to or associate with a money or care barrier in these two regimes are crippling for CVET participation, with low SES having a predicted likelihood of participating at 14.4% (money barrier in Germany), 23.7% or 27.3% (care barriers in Germany and the UK) and 35.6% (money barrier in UK). These reflect the lowest predicted margins in the table.

Table 3. Average marginal effects of barriers by education and occupational status on CVET participation and predicted CVET likelihoods, by country

	Germany				Sweden				United Kingdom			
Variable	AME	PM	90% CI		AME	PM	90% CI		AME	PM	90% CI	
No barrier		**0.882**	**0.850**	**0.915**		**0.869**	**0.846**	**0.892**		**0.913**	**0.892**	**0.934**
Non-tertiary educ.		0.886	0.844	0.928		0.880	0.852	0.908		0.912	0.881	0.944
Tertiary education		0.876	0.805	0.947		0.838	0.789	0.886		0.914	0.878	0.950
Manual occupation		0.774	0.676	0.873		0.721	0.635	0.807		0.811	0.721	0.900
Non-manual occup.		0.884	0.804	0.965		0.753	0.674	0.832		0.907	0.859	0.955
Professionals		0.920	0.885	0.955		0.958	0.939	0.978		0.960	0.942	0.977
LOW SES		0.783	0.707	0.859		0.758	0.685	0.831		0.809	0.728	0.889
HIGH SES		0.916	0.872	0.960		0.948	0.926	0.971		0.960	0.942	0.978
Time barrier	**-0.172***	**0.721**	**0.683**	**0.759**	**-0.210***	**0.688**	**0.647**	**0.729**	**-0.203***	**0.742**	**0.701**	**0.782**
Non-tertiary educ.	-0.219*	0.683	0.626	0.739	-0.234*	0.678	0.613	0.743	-0.228*	0.707	0.646	0.768
Tertiary education	-0.115†	0.773	0.724	0.821	-0.165*	0.701	0.638	0.764	-0.178*	0.772	0.716	0.828
Manual occupation	-0.192*	0.565	0.452	0.677	-0.156†	0.563	0.434	0.693	-0.092	0.718	0.631	0.805
Non-manual occup.	-0.216*	0.680	0.593	0.767	-0.167*	0.585	0.485	0.685	-0.209*	0.717	0.625	0.808
Professionals	-0.140*	0.805	0.762	0.848	-0.242*	0.768	0.718	0.818	-0.245*	0.765	0.717	0.813
LOW SES	-0.249†	0.508	0.395	0.620	-0.206†	0.550	0.414	0.686	-0.122†	0.680	0.587	0.773
HIGH SES	-0.090†	0.845	0.809	0.880	-0.220*	0.779	0.730	0.828	-0.224*	0.793	0.748	0.838
Money barrier	**-0.235***	**0.668**	**0.590**	**0.747**	**-0.309***	**0.620**	**0.536**	**0.705**	**-0.348***	**0.626**	**0.565**	**0.688**
Non-tertiary educ.	-0.281*	0.644	0.531	0.757	-0.441*	0.489	0.367	0.610	-0.390*	0.579	0.475	0.684
Tertiary education	-0.206†	0.690	0.552	0.828	-0.139	0.764	0.656	0.871	-0.314*	0.670	0.581	0.759
Manual occupation	-0.524*	0.164	-0.142	0.471	-0.248*	0.461	0.280	0.642	-0.386*	0.418	0.205	0.631
Non-manual occup.	-0.009	0.878	0.780	0.977	-0.058	0.797	0.648	0.946	-0.450*	0.492	0.374	0.610
Professionals	-0.249*	0.738	0.611	0.866	-0.448*	0.593	0.478	0.709	-0.283*	0.774	0.686	0.861
LOW SES	-0.518*	0.144	-0.087	0.376	-0.421*	0.316	0.119	0.513	-0.432*	0.356	0.155	0.558
HIGH SES	-0.201†	0.767	0.650	0.885	-0.302*	0.754	0.623	0.885	-0.251*	0.810	0.728	0.892
Support barrier	**-0.164***	**0.758**	**0.678**	**0.837**	**-0.387***	**0.542**	**0.460**	**0.625**	**-0.192***	**0.776**	**0.665**	**0.887**
Non-tertiary educ.	-0.168*	0.769	0.681	0.857	-0.383*	0.561	0.420	0.701	-0.043	0.885	0.789	0.981
Tertiary education	-0.166	0.744	0.618	0.871	-0.376*	0.521	0.373	0.670	-0.323*	0.657	0.461	0.853
Manual occupation	-0.153	0.623	0.402	0.844	-0.008	0.714	0.514	0.914	-0.055	0.752	0.439	1.065
Non-manual occup.	-0.135	0.787	0.623	0.950	-0.262†	0.488	0.264	0.713	-0.378*	0.562	0.248	0.876
Professionals	-0.186*	0.791	0.703	0.878	-0.531*	0.508	0.386	0.630	-0.163	0.870	0.773	0.967
LOW SES	-0.146	0.639	0.443	0.835	-0.033	0.729	0.551	0.907	0.109	0.893	0.772	1.015
HIGH SES	-0.184†	0.779	0.683	0.874	-0.546*	0.486	0.356	0.617	-0.277†	0.799	0.650	0.947
Care barrier	**-0.349***	**0.569**	**0.489**	**0.649**	**-0.327***	**0.604**	**0.533**	**0.676**	**-0.310***	**0.668**	**0.598**	**0.738**
Non-tertiary educ.	-0.429*	0.506	0.388	0.623	-0.408*	0.542	0.421	0.663	-0.395*	0.581	0.485	0.676
Tertiary education	-0.276*	0.637	0.517	0.756	-0.218*	0.685	0.585	0.784	-0.243*	0.744	0.637	0.851
Manual occupation	-0.432*	0.299	0.060	0.537	-0.140	0.578	0.377	0.780	-0.412*	0.382	0.169	0.595
Non-manual occup.	-0.347*	0.583	0.426	0.741	-0.339*	0.404	0.249	0.560	-0.239*	0.711	0.571	0.850
Professionals	-0.331*	0.657	0.553	0.761	-0.364*	0.688	0.585	0.792	-0.312*	0.749	0.640	0.858
LOW SES	-0.471*	0.237	0.036	0.439	-0.251†	0.506	0.310	0.702	-0.496*	0.273	0.088	0.458
HIGH SES	-0.244†	0.725	0.626	0.823	-0.281*	0.764	0.684	0.845	-0.247†	0.820	0.707	0.934

Notes. PIAAC 2012. *p<.05 †p<.10. Sample restricted to those identified as intrinsically interested in training participation (see Table 2). Unweighted N = (DE) 1,252, (SE) 1,192 and (UK) 1,922. AME (Average Marginal Effect) and PM (Predicted Margin) taken from pooled logistic regression (see also Odds-Ratios in Table A5 and Stata code in Breznau, 2026) controlling for male, age, age^2, children, scope of employment, contract type, and public sector, using jackknife estimation with replicate weights (svyset & spfwt*). Effects for Germany, Sweden, and the UK obtained from country-interactions in a pooled model. 'No barrier' has no AME because it is the reference category – it includes respondents reporting no barrier, plus 18% that reported 'other' (meaning no major barrier).

Conclusion and implications

This paper investigated how the interplay of different institutional contexts of interlinked welfare states, political economies and skill formation regimes generate differences in CVET participation within and between Germany, Sweden, and the UK. With PIAAC Cycle I data we showed that Sweden had the highest incidence and mostly smallest socio-economic differences in CVET. Consistent with its universal welfare and skill formation regime, the institutions enable broader agency across groups independent of their socio-economic status. In contrast, Germany had comparatively lower participation with distinctive sometimes extreme socio-economic gradients, consistent with the conservative/corporatist regime institutions. Despite a redistributive social state, the

policies of tracking and institutionalised status maintenance are reproduced in CVET participation. In the UK, CVET and respective socio-economic differences are relatively high – bounded by a liberal institutional regime.

Continued selectivity across all three regimes counteracts the idea of CVET as an equaliser of labour market and life chances, and thus of a universally preventive measure against the need for social policy interventions. Especially in Germany and the UK it appears more as a means of status maintenance (Kleinert & Jacob, 2019). Even in Sweden training appears to nudge people without engendering sweeping equality. It is possible that universal training provision provides only slightly better prospects for the collective formation of skills within a society. Perhaps universal and targeted policies simultaneously might be necessary to go further; however, this does not automatically resolve inequalities in the subjective desires for training among people. A normative shift would need to take place simultaneously where more people wanted to train and more often, otherwise they are bounded by their own rational position of not wanting to train.

We argue that the barriers investigated herein are part of the reason that policies designed to enhance CVET are limited in their impacts, and perhaps engender or reify lack of interest. Participation decisions involve a micro-level cost-benefit calculus, which is easily constrained or defined by meso- and macro-level factors like families, educational configurations and national policies. Investigating barriers helps move below the surface from analyses that have long dichotomised CVET into participation and not (Karger et al., 2025). Scarce resources and various actors are mechanisms in between institutions, individuals and CVET, even when states (like Sweden) or states in collaboration with firms (like in Germany) provide a substantial amount of CVET opportunities. These barriers reflect adults' motivations that themselves are reflections of the institutions of these countries.

The high rates of lack of intrinsic interest in Germany (58.9%) and the UK (57.6%) compared to Sweden (51.8%) understood through a critical adult learning theoretical lens suggests that interest is socially constructed by those whose learning is legitimised and funded. Therefore, merely reducing costs (money/care) will not address this implicit barrier; policy may need to move toward rights-based entitlements that democratise participation to increase interest and shift long-standing norms. The point is that regardless of whether a regime like Sweden offers universal and cost-free training opportunities, the individuals would still need to be aware of these and motivated to want them before any institutional impact on adult learning can occur.

Although not necessarily measurable here, there are strong reasons to believe many aspects of multi-level institutions are the root of CVET participation rates and variation in interest. Early socialisation and integration into the labour market have institutional effects on individual motivations over the life course. As such, policies aimed to increase CVET interest may be unsuccessful. They would need educate the population on CVET benefits in terms of employability and skill development if not simply higher incomes to shift motivations and norms, before trying to simply offer lots of training. Also useful could be educating employers to motivate their workers for CVET, especially those normally more reluctant to engage in CVET (Cooney & Stuart, 2012). A long-term institutional perspective is crucial as change must be implemented in younger cohorts that carry the idea of training and upskilling with them into older work life, and in promoting different norms in society that become reified and used to re-frame cost benefit calculations. In Germany these norms would have to shift away from strong reliance on status, and in the UK reliance on the market – changes hard to imagine in such codified systems.

While training achieves productivity increases and potentially spreads knowledge, there is the open possibility that there are cultural differences that play a role and simply lead people to not want to train as much regardless of policy changes – but to accept this we have to abandon the tendency among education researchers to normatively see education as something that lower SES persons *should* want and *must* have. If something is out of alignment with cultural norms and/or popular preferences, is it an adult education researcher's role to try and change it?

Independent of inter-subjectivity, our findings point toward country-variation in the important role of the state and firms. Given weak state-involvement in CVET provision in the UK, firms neither act as gatekeepers nor facilitators as workers train despite lack of employer support. In Sweden, workers and firms rely on generous state provision of CVET, yet particularly for high-status workers, employers seem to act as gatekeepers; here, maybe employers deliberately consult with their workers about their career and CVET plans and deny CVET in special cases where high-skilled workers have already trained extensively. In Germany with strong state and firm involvement in skill formation, lack of employer support still matters but less. We have to consider that a respondent in Germany might want to train more despite already training a lot, and choses the best answer heuristically from the list of choices. More research is necessary. Firms in combination with the state may still play an important role by providing financial resources in terms of CVET incentives and subsidies, particularly to low-status workers. Taken together, these findings show first evidence for the differential role of constraints within the complex relationship of state, firms, and workers.

Also, considering family responsibilities, this research provides novel insight into how different CVET regimes interact with and depend on other life and policy domains. Social policies fostering state-provision of child and family care may not only increase female labour market participation but also facilitate especially female CVET engagement. This may not be directly necessary in Sweden where the care barrier gradients are negligible; the share of employed women (and mothers) is extremely high, and care opportunities are easily available. The care barrier matters maybe more than expected in Germany, not because of a lack of extensive childcare but because gender roles are slightly more traditional than in other countries. Despite our complex analyses here, it highlights that more research is necessary and that studying regimes is a trade-off which sacrifices the true complexity of a society and its institutions with the goal of trying to isolate specific effects. Particularly in the UK, lack of public care facilities restricts CVET for the low-status workers, so that increasing availability and affordability should have immediate priority in policy making seeking to boost CVET (see Gambaro, 2017).

Focusing on barriers, which arise from the interdependencies of individual circumstances and institutional configurations, scarce resources, and actors that reinforce or alleviate these constraints, this paper generally shows that increasing CVET participation involves a broader spectrum of actors working together. Yet, targeted policy measures always have to reach beyond the traditional CVET clientele and try to reduce burdens and barriers specifically for the less advantaged. This assumes normatively that more CVET is a 'good' thing. The research screams at this point from a human capital and economic growth perspective (Hanushek & Woessmann, 2008), but of course each democratic society technically has the right to choose for 'itself' what priorities it sets. Adult education is often discussed, but far less funded in general than health care or welfare state social securities, for example.

Our results do not prove any one theoretical perspective is correct, or more correct than another. This is the institutionalist paradigm: We need the blending of diverse theories to understand and parsimoniously model extremely complex systems that operate

at different levels to study the idea of a regime and how it relates to participation in continuing vocational education and training (Boeren et al., 2010; Desjardins & Ioannidou, 2020; Schrader, 2009). This paper thus opens up future research. First, investigating other situational and intrinsic barriers, and especially their interplay, should offer better insight into the complex process of CVET participation under different institutional contexts. Yet, this largely depends on future data collection; having a direct (instead of inferred) measure of interest will be necessary to appropriately model the CVET process. Nonetheless, our brief theoretical and methodological validation of measuring interest and lack of interest using PIAAC (see Fig. A1) provides a baseline that future scholars could develop methodologically. There are unique features of PIAAC such as the high-quality measurement of skills that would enable new research avenues that are not yet possible due to data limitations, in investigating intrinsic lack of interest in CVET. An important note to this point is that the Public Use Files of the new PIAAC cycle do not provide occupational status variables, and the measurement of CVET (variable NFE12JR in PIAAC) changed between cycles rendering comparison over time, or even repeating an analysis similar to ours here not possible.

Second, as PIAAC was conducted after the 2008 financial crisis, a follow-up study is necessary to assess the longer-term effects of these macro-economic conditions in shaping barriers to and needs for CVET. As this is not possible in Cycle 2 of PIAAC, it may not be possible. Also, to evaluate the effectiveness of certain policies aiming directly at increasing CVET or indirectly by targeting barriers would anyways require genuine longitudinal data (repeated measures, same sample). Third, our research does not focus on sex differences (Massing & Gauly, 2017). Particularly with respect to how barriers arise and thus limit CVET chances, there may be motherhood disadvantages. Fourth, other countries may be included in future analyses to better grasp within- and between-country variation in barrier prevalence and CVET incidence (Roosmaa & Saar, 2017). For instance, in-depth research on the Scandinavian countries calls a homogeneous Nordic type into question (Tikkanen & Nissinen, 2016), while others suggest that differences within coordinated market economies are larger than between (Harcourt & Wood, 2007).

Notes

1 Whether institutions are simply the sum of individual cognitive processes or actually exist as extra-individual things, and whether social norms should be treated separately from institutions are debates we do not take up here.

2 Also based on two very helpful peer reviewers.

3 Other barriers in access to CVET are possible, like health-related problems or lack of educational requirements, however they do not directly relate to institutional context differences and thus are beyond the scope of this paper.

4 We borrow the age variable from the German Scientific Use File, to enable year-for-year age comparison (see Online Repository in Breznau, 2026).

5 The exact course content is unknown. Also, respondents may have labelled courses taken for personal reasons work-related if they assumed these to be important for their job.

6 The other answer options were ‘I did not have the prerequisites’; ‘The course or programme was offered at an inconvenient time or place’; ‘Something unexpected came up that prevented me from taking education or training’; and ‘Other’ (OECD, 2010, pp. 32-33).

7 It is unknown whether the worker or the employer initiated CVET, thus whose interest is reflected through participation.

8 Steps 1 and 2 use country-specific mean-standardised probability weights to account for the likelihood of being sampled and to restrict the impact of each country to being equal in the pooled models.

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The authors declare no potential conflicts of interest with respect to the research, authorship or publication of this article.

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Appendices

Figure A1. Measuring no interest in CVET

A. Face Validity

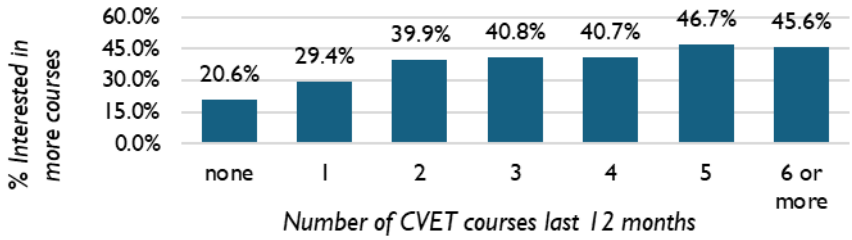
PIAAC variable **B_26a**, has face validity in measuring a lack of interest in CVET because it asks if they wanted to engage in 'any' (or 'more' in case they participated in others) learning activities in a very broad sense (for qualifications or in general). If they did not want to, that is literally a lack of interest.

The problem is that there are likely to be persons who had all of their interests in training/learning fulfilled. Therefore, they answer 'no' to this question, but are/were interested in training.

Question [verbatim English]: ***'In the last 12 months, were there any [more] learning activities you wanted to take part in but did not? Include both learning activities that lead to formal qualifications and other organised learning activities***.'

B. Lack of Diminishing Interest

Respondents who took more courses reported more interest, with a saturation point appearing after two or more courses. There is not a clear pattern of 'interest fulfilment'.



C. Lack of Interest Reflects Dislike of Learning

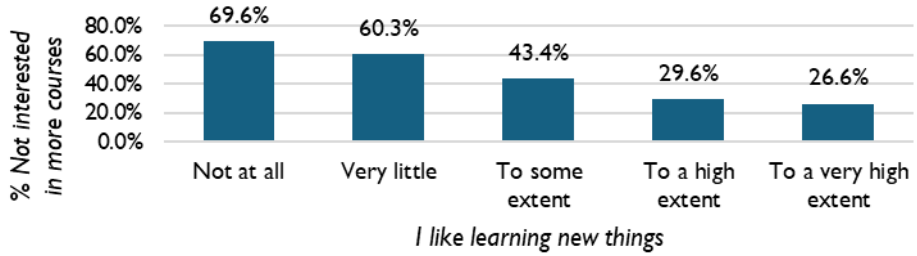
Those who are not interested in further education and training should be people who are less likely to enjoy learning in general. PIAAC variable **I_Q04d** asks respondents to relate to the following statement [verbatim English]: ***'I like learning new things'***

RESPONSES:

1 ***'Not at all'***
2 '***Very little'***
3 '***To some extent'***
4 '***To a high extent'***
5 '***To a very high extent'***

D. Like Learning and Lack of Interest: Statistical Associations

*D1. Percent not interested in more courses (**B_26a**) by like of learning response (**I_Q04**)*



D2. Pearson's Correlations

	[1]	[2]	[3]	[4]
[1] Want more courses	1.000			
[2] Like learning new things	-0.165	1.000		
[3] Participated in CVET	-0.810	0.113	1.000	
[4] Number of courses	-0.568	0.149	0.645	1.000

Table A1. Descriptive statistics by country (mean and standard error, s.e.)

	All Three		**Germany**		**Sweden**		**UK**	
	%	s.e.	%	s.e.	%	s.e.	%	s.e.
CVET	56.44	0.66	53.09	1.30	59.45	0.94	56.78	1.15
Male	52.79	0.23	52.96	0.50	51.94	0.41	53.48	0.26
Age (*mean*)	*40.75*	*0.05*	*41.44*	*0.09*	*40.77*	*0.11*	*40.05*	*0.08*
Children	70.63	0.53	70.16	0.90	73.60	0.94	68.14	0.91
Tertiary education[a]	39.39	0.44	36.22	0.75	37.33	0.64	44.63	0.86
Primary education[a]	11.99	0.34	8.39	0.59	10.65	0.49	16.93	0.68
ISCO 4, occupation[b]	44.64	0.47	40.67	0.75	50.39	0.73	42.88	0.94
ISCO 3, occupation[b]	28.43	0.50	28.80	0.81	25.13	0.77	31.35	0.99
ISCO 2, occupation[b]	20.00	0.42	23.47	0.81	20.15	0.69	16.38	0.69
Full-time	73.13	0.49	68.64	0.85	78.04	0.95	72.70	0.72
Part-time	20.19	0.44	24.26	0.75	15.58	0.89	20.74	0.61
Permanent contract	71.97	0.56	72.30	0.97	75.67	0.87	67.94	1.03
Temporary contract	8.01	0.28	9.09	0.49	7.29	0.46	7.65	0.51
Public sector	24.93	0.49	18.72	0.81	31.50	0.89	24.58	0.85
Presence of any barrier	32.35	0.59	32.73	0.96	36.42	1.01	27.89	1.09
Time barrier	15.51	0.44	17.18	0.75	16.20	0.80	13.14	0.71
Money barrier	3.93	0.22	2.69	0.29	3.72	0.39	5.40	0.46
Support barrier	3.20	0.21	3.65	0.40	3.25	0.33	2.70	0.35
Care barrier	4.37	0.24	4.43	0.50	5.36	0.42	3.31	0.29
Lack of interest	33.18	0.65	37.20	1.27	27.94	0.83	34.39	1.21

Notes. PIAAC 2012, data subset to those aged 25-55 and in the labor force, authors' own estimations using *piaactools* Stata ado-files (Jakubowski & Pokropek, 2019). Unweighted N = 9,867 (DE = 2,931, SE = 2,374, UK = 4,562). [a] Secondary omitted category. [b] PIAAC international ISCO scheme where 4 = Skilled, 3 = Semi-skilled, white-collar, 2 = Semi-skilled blue-collar, and 1 = Elementary.

Table A2. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) CVET	1.00																				
(2) Male	0.02	1.00																			
(3) Age	0.00	-0.02	1.00																		
(4) Children	-0.04	-0.09	0.38	1.00																	
(5) Tertiary education	0.19	-0.01	-0.04	-0.10	1.00																
(6) Blue-collar	-0.12	0.37	0.01	0.04	-0.26	1.00															
(7) Professional	0.25	-0.02	-0.02	-0.07	0.50	-0.44	1.00														
(8) Full-time	0.15	0.41	-0.02	-0.16	0.08	0.19	0.11	1.00													
(9) Part-time	-0.11	-0.41	0.06	0.17	-0.07	-0.20	-0.09	-0.84	1.00												
(10) Permanent contract	0.15	-0.03	0.04	0.03	0.02	-0.05	0.07	0.18	-0.02	1.00											
(11) Temporary contract	0.00	-0.03	-0.11	-0.06	0.01	-0.03	-0.03	-0.03	0.06	-0.47	1.00										
(12) Public sector	0.18	-0.17	0.07	0.04	0.19	-0.20	0.16	-0.03	0.08	0.13	0.09	1.00									
(13) Presence of barrier	0.20	-0.05	-0.04	-0.03	0.16	-0.11	0.16	0.00	-0.01	-0.01	0.01	0.10	1.00								
(14) Time barrier	0.18	0.04	0.00	-0.06	0.15	-0.07	0.16	0.12	-0.09	0.02	0.00	0.06	0.64	1.00							
(15) Money barrier	0.02	-0.05	-0.05	-0.03	0.04	-0.04	0.01	-0.07	0.04	-0.07	0.03	0.00	0.29	-0.08	1.00						
(16) Support barrier	0.08	-0.02	0.00	-0.01	0.03	-0.02	0.05	0.01	-0.02	0.03	0.00	0.03	0.27	-0.08	-0.04	1.00					
(17) Care barrier	0.01	-0.12	-0.02	0.11	0.04	-0.06	0.05	-0.13	0.12	-0.01	-0.01	0.03	0.31	-0.09	-0.04	-0.04	1.00				
(18) Lack of interest	-0.38	0.03	0.03	0.04	-0.20	0.14	-0.23	-0.05	0.04	-0.02	-0.01	-0.13	-0.79	-0.51	-0.23	-0.22	-0.24	1.00			
(19) Germany	-0.04	0.00	0.07	0.01	-0.07	0.08	-0.03	-0.05	0.05	0.04	0.03	-0.08	0.04	0.05	-0.06	0.02	0.02	0.02	1.00		
(20) Sweden	0.02	-0.01	0.00	0.02	-0.01	0.00	0.04	0.04	-0.04	0.03	-0.01	0.06	0.03	0.00	0.00	0.00	0.02	-0.03	-0.30	1.00	
(21) United Kingdom	0.03	0.01	-0.07	-0.02	0.08	-0.08	0.01	0.03	-0.03	-0.05	-0.02	0.05	-0.05	-0.05	0.07	-0.02	-0.03	-0.01	-0.88	-0.20	1.00

Notes. PIAAC 2012, pairwise estimations using aweight = SPFWT0.

Table A3. Logistic regressions predicting CVET participation, odds ratios

	Pooled model				Country models		
Variable	OR (SE)	xGER	xSWE	xUK	Germany	Sweden	UK
Male	1.169*				1.315*	1.057	0.974
	(0.081)				(0.128)	(0.119)	(0.106)
Age	1.077*				1.132†	0.922	1.030
	(0.040)				(0.073)	(0.054)	(0.049)
Age^2	0.999†				0.999†	1.001	1.000
	(0.000)				(0.001)	(0.001)	(0.001)
Children	0.947				0.856	0.945	1.112
	(0.069)				(0.092)	(0.095)	(0.116)
Tertiary education		1.288*	0.849	0.942	1.270*	1.056	1.214†
		(0.141)	(0.133)	(0.146)	(0.141)	(0.107)	(0.134)
Non-manual, occ.		1.954*	0.634*	0.742†	2.097*	1.148	1.232
		(0.200)	(0.094)	(0.127)	(0.224)	(0.159)	(0.167)
Professionals		3.130*	0.747	0.717†	3.342*	2.344*	2.120*
		(0.376)	(0.135)	(0.129)	(0.408)	(0.314)	(0.273)
Full-time	1.522*				2.062*	2.040*	0.861
	(0.190)				(0.383)	(0.384)	(0.188)
Part-time	0.834				1.147	1.329	0.470*
	(0.113)				(0.248)	(0.298)	(0.119)
Permanent contract	2.019*				1.698*	1.841*	2.584*
	(0.148)				(0.212)	(0.237)	(0.285)
Temporary contract	1.734*				1.452	1.201	2.388*
	(0.248)				(0.338)	(0.261)	(0.439)
Public sector	1.744*				1.481*	1.629*	2.122*
	(0.142)				(0.186)	(0.175)	(0.287)
Barrier presence		2.415*	0.554*	0.780†	2.423*	1.328*	1.866*
		(0.263)	(0.080)	(0.109)	(0.261)	(0.133)	(0.176)
Constant [Baseline odds]		[0.035*]	1.729*	1.571*	[0.011*]	[1.515]	[0.184†]
		(0.026)	(0.203)	(0.187)	(0.014)	(1.837)	(0.178)
N		9,853			2,931	2,367	4,555

Notes. PIAAC 2012 logistic regressions using jackknife estimation with replicate weights (svyset & spfwt*). Odds-ratios with standard errors in parentheses, †.p <0.10, * p<0.05. DE is the reference country, therefore odds-ratios for SE and UK are relative to this. Country-specific models included as sensitivity analyses.

Table A4. Logistic regressions predicting lack of CVET interest, odds ratios

	Pooled model				Country models		
Variable	OR (SE)	xGER	xSWE	xUK	Germany	Sweden	UK
Male	1.096				1.156	0.979	1.052
	(0.074)				(0.105)	(0.086)	(0.098)
Age	0.923*				0.870*	0.966	0.995
	(0.034)				(0.043)	(0.054)	(0.053)
Age^2	1.001*				1.002*	1.001	1.000
	(0.000)				(0.001)	(0.001)	(0.001)
Children	1.045				1.136	0.996	0.921
	(0.080)				(0.134)	(0.120)	(0.091)
Tertiary education		0.663*	1.033	0.941	0.666*	0.655*	0.624*
		(0.070)	(0.162)	(0.139)	(0.073)	(0.066)	(0.068)
Non-manual, occ.		0.647*	1.475*	1.325	0.650*	0.877	0.876
		(0.082)	(0.277)	(0.240)	(0.084)	(0.122)	(0.120)
Professionals		0.381*	1.518*	1.398†	0.381*	0.537*	0.530*
		(0.041)	(0.242)	(0.249)	(0.042)	(0.065)	(0.067)
Full-time	0.974				0.849	0.732	1.256
	(0.132)				(0.185)	(0.143)	(0.253)
Part-time	1.265†				1.150	0.681	1.595*
	(0.173)				(0.261)	(0.160)	(0.356)
Permanent contract	1.074				1.202	1.158	0.921
	(0.0482)				(0.140)	(0.155)	(0.117)
Temporary contract	1.058				1.227	1.277	0.831
	(0.145)				(0.245)	(0.252)	(0.136)
Public sector	0.656*				0.680*	0.872	0.595*
	(0.052)				(0.074)	(0.088)	(0.070)
Constant		10.646*	0.623*	0.857	31.080*	3.315	2.186
		(7.791)	(0.086)	(0.119)	(30.938)	(3.619)	(2.238)
N			9,853		2,931	2,367	4,555

Notes. PIAAC 2012 logistic regressions using jackknife estimation with replicate weights (svyset & spfwt*). Odds-ratios with standard errors in parentheses, †.p <0.10, * p<0.05. DE is the reference country, therefore odds-ratios for SE and UK are relative to this. Country-specific models included as sensitivity analyses. Lack of interest defined as those who participated in 3 or less courses in the last 12 months and answered 'No' to the question 'In the last 12 months, were there more learning activities you wanted to take part in but did not? Include both learning activities that lead to formal qualifications and other organised learning activities.'

Table A5. Logistic regressions including barriers predicting CVET participation for those interested in training, odds ratios

	Pooled model				Country models		
	OR (SE)	xGER	xSWE	xUK	Germany	Sweden	UK
Male	1.041				1.050	1.049	0.951
	(0.160)				(0.235)	(0.168)	(0.204)
Age	1.154*				1.142	0.989	1.253*
	(0.075)				(0.120)	(0.095)	(0.108)
Age^2	0.998*				0.998	1.000	0.997*
	(0.001)				(0.001)	(0.001)	(0.001)
Children	1.285				1.408	1.185	1.159
	(0.205)				(0.317)	(0.216)	(0.269)
Full-time	1.924*				3.217†	2.465*	0.775
	(0.450)				(1.047)	(0.717)	(0.284)
Part-time	0.938				1.324	1.515	0.523
	(0.264)				(0.515)	(0.571)	(0.246)
Permanent contract	1.862*				1.497	1.495*	2.866*
	(0.298)				(0.377)	(0.282)	(0.603)
Temporary contract	1.774*				1.204	1.048	4.457*
	(0.378)				(0.386)	(0.400)	(1.446)
Public sector	1.520*				1.394	1.469*	1.722*
	(0.209)				(0.289)	(0.247)	(0.379)
Tertiary education		0.900	0.723	1.141	0.905	0.639	0.964
		(0.499)	(0.504)	(0.815)	(0.518)	(0.236)	(0.430)
Non-manual, occ.		2.299	0.518	1.027	2.309	1.222	2.129
		(1.312)	(0.297)	(0.728)	(1.353)	(0.433)	(1.174)
Professionals		3.498*	2.747	1.689	3.373*	10.437*	5.911*
		(1.672)	(1.791)	(1.154)	(1.726)	(4.349)	(3.007)
Time barrier		0.267*	1.389	1.801	0.231†	0.374*	0.492
		(0.110)	(0.744)	(1.197)	(0.097)	(0.155)	(0.215)
Ed tert*Time		1.851	0.940	0.757	1.776	1.774	1.403
		(1.144)	(0.761)	(0.610)	(1.134)	(0.870)	(0.751)
Semi-skilled, white*Time		0.740	1.249	0.568	0.834	0.889	0.373
		(0.526)	(1.039)	(0.545)	(0.604)	(0.505)	(0.233)
Skilled*Time		0.989	0.285	0.224†	1.137	0.275**	0.213*
		(0.557)	(0.216)	(0.176)	(0.669)	(0.152)	(0.130)
Money barrier		0.040*	3.295	2.827	0.037*	0.144*	0.111*
		(0.048)	(4.243)	(3.659)	(0.045)	(0.091)	(0.070)
Ed tert *Money		1.507	3.979	1.044	1.429	6.527*	1.662
		(1.451)	(4.496)	(1.173)	(1.427)	(3.681)	(1.083)
Semi-skilled, white*Money		19.386*	0.256	0.030*	22.786*	4.466	0.497
		(26.931)	(0.442)	(0.046)	(17.133)	(4.024)	(0.382)
Skilled*Money		4.756	0.041†	0.194	5.480	0.173*	0.855
		(7.804)	(0.076)	(0.367)	(9.296)	(0.135)	(0.739)
Support barrier		0.473	1.802	4.337	0.442	0.911	1.785
		(0.296)	(1.362)	(4.930)	(0.297)	(0.557)	(1.556)
Ed tert *Support		0.961	1.348	0.190	0.975	1.274	0.223
		(0.636)	(1.396)	(0.237)	(0.660)	(0.907)	(0.217)
Semi-skilled, white*Support		1.010	0.302	0.152	1.057	0.299	0.151
		(1.004)	(0.390)	(0.231)	(1.071)	(0.278)	(0.202)
Skilled*Support		0.682	0.060*	0.603	0.767	0.038*	0.360
		(0.528)	(0.069)	(1.038)	(0.618)	(0.036)	(0.533)
Care responsibility barrier		0.076*	4.037	0.997	0.070*	0.332*	0.303
		(0.054)	(3.512)	(0.986)	(0.049)	(0.178)	(0.173)
Ed tert *Care		2.066	1.492	1.152	2.109	3.145*	1.853
		(1.451)	(1.417)	(1.033)	(1.530)	(1.783)	(0.713)
Semi-skilled, white*Care		1.575	0.247	1.266	1.735	0.371	2.319
		(1.548)	(0.266)	(1.748)	(1.699)	(0.268)	(1.415)
Skilled*Care		1.454	0.121†	0.681	1.687	0.169*	1.955
		(1.354)	(0.138)	(0.900)	(1.597)	(0.117)	(1.196)
Constant		0.087†	0.760	1.156	0.091	1.098	0.036*
		(0.118)	(0.249)	(0.512)	(0.198)	(2.066)	(0.060)
N		4,355			1,251	1,187	1,917

Notes. PIAAC 2012. Logistic regressions using jackknife estimation with replicate weights (svyset & spfwt*). Odds-ratios with standard errors in parentheses, †.p <0.10, * p<0.05. DE is the reference country, therefore odds-ratios for SE and UK are relative to this. Country-specific models included as sensitivity analyses. Barriers that are not an interaction term can be interpreted as that barrier's effect for non-tertiary educated blue-collar workers.