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Cross-national validation of the non-participation in non-formal education questionnaire: Findings from adults from Sweden, Germany, United Kingdom, and the Czech republic

Jitka Vaculíková[1]*, Jan Kalenda[1] and Ilona Kočvarová[1]

Abstract: Non-formal adult education (NFE) provides adults of all ages with the opportunity to acquire skills, knowledge, and expertise. However, there is currently a lack of validated instruments that measure the factors of NFE non-participation in European countries, particularly their barriers. One exception is the Non-participation in Non-formal Education Questionnaire (NP-NFE-Q). This study evaluates and compares the psychometric properties of this instrument among adults across four purposefully selected European countries: Sweden, Germany, the United Kingdom, and the Czech Republic. The results indicate a good model fit for a three-factor model across randomly split pooled samples and for all countries (min. CFI, TLI, and GFI =.932, .908, and .941, max. RMSEA =.079). The findings reveal that adults currently face barriers in three key forms: (1) worries and (2) needs regarding NFE at the micro level and (3) the need for more suitable provision at the macro level.

Subjects: Adult Education; Lifelong Learning

Keywords: non-formal adult education; adult education; barriers to participation in adult education; factor structure; cross-national validation

1. Introduction

Adults represent the most frequently involved age category in non-formal education and training (Eurostat, 2022). However, almost two-thirds of advanced capitalist countries have not been involved in any non-formal adult education (NFE) during the last decade (Boeren, 2016;

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Desjardins & Ioannidou, 2020; Desjardins, 2017; Rubenson, 2018). This occurs even though participation in NFE is considered essential for employability and mitigating the obsolescence of individuals' skills (OECD, 2019), as well as for enhancing adults' well-being or civic engagement (Field, 2012; Iñiguez-Berrozpe et al., 2020). According to UNESCO (2019, 2020) reports, one of the key issues behind limited participation in NFE is the various barriers that adults face. Although there has been little research interest in studying the barriers to participation in Adult Education and Training (AET) during the 1990s and 2000s (Rubenson & Desjardins, 2009), the situation has slowly changed over the last decade. In recent years, perceived barriers to AET have been deemed a significant factor in adult decision-making regarding participation in organized learning (Boeren, 2016; Cabus et al., 2020; Desjardins, 2017; Hovdhaugen & Opheim, 2018; Van Nieuwenhove & De Wever, 2021a).

In this regard, scholars (Boeren, 2016; Kondrup, 2015; Rubenson, 2011, 2018) have carried out both theoretical assessments of the key theoretical framework used for the investigation of perceived barriers to AET, Patricia Cross (1981) conception, and systematic quantitative research utilising data from international comparative surveys like the *Adult Education Survey* (AES) from 2007 (Desjardins & Rubenson, 2013; Roosmaa & Saar, 2017), AES 2016 (Vaculíková et al., 2020), *Programme for the International Assessment of Adult Competencies* (PIAAC) (Hovdhaugen & Opheim, 2018; Van Nieuwenhove & De Wever, 2021b), and the *Labour Force Survey* (Cabus et al., 2020), as well as smaller quantitative studies at the national and regional level (Gao et al., 2022; Kalenda et al., 2022; Lischewski et al., 2020; Morris et al., 2022). Additionally, a series of qualitative studies have been conducted at the national and international levels among at-risk adults, who often encounter these constraints not only in the workplace but also in their social environment outside of work (Karger et al., 2022a; Paldanius, 2007).

Despite significant findings on the international variability of perceived barriers across countries and differences among social groups, the research stream has neglected a systematic methodological examination of the underlying theoretical concepts of measuring barriers to AET and the validation of new research instruments to further explore the factors behind non-participation. The majority of current research on AET continues to rely heavily on Cross's (1981) triadic typology of constraints (Cabus et al., 2020; Roosmaa & Saar, 2017; Van Nieuwenhove & De Wever, 2021a).

Cross (1981) famously differentiated between the following: (1) *Dispositional barriers* refer to the perceptions of obstacles related to adults' lives, educational needs, and experiences. These barriers often consist of concerns about participation in organized learning, the meaningfulness of continuing on an academic path, or a lower level of self-efficacy. (2) *Institutional barriers* are obstacles for education providers. Perceptions of educational opportunities and quality of education are the primary factors contributing to institutional barriers. (3) *Situational barriers* are directly linked to an individual's life situation. These barriers may prevent adults from participating in AET, even if they perceive value and have sufficient opportunities. Common situational obstacles include a lack of time, family responsibilities, and lack of support from employers. However, if this conceptualization is employed, which and how many items measure these three factors and their validity level has not often been critiqued. Additionally, there has been a lack of critical reevaluation of these factors and the items behind them.

The reason for this revaluation is apparent. The social environment of adults has undergone significant changes over the past two decades, potentially affecting the validity of the theoretical constructs and items used to measure barriers. First, the development and widespread use of new information and communications technologies and platforms have improved access to online AET, reducing the impact of place of residence as a barrier to participation. This trend has been further amplified by the COVID-19 pandemic and the shift towards remote and hybrid work arrangements by many employers (ILO, 2022b). This transformation process may have a profound impact on the understanding of situational barriers. Second, the increasing integration of older workers into the labor market and the rise in average life expectancy may change the perception of age-related

barriers to AET, particularly among those aged 55–64 years (Hearm & Parkin, 2020). Third, the provision of AET in many OECD countries has nearly doubled from the 1990s to the early 2010s (Desjardins & Ioannidou, 2020; Desjardins, 2017), potentially reducing barriers to AET by providing more organized learning options. This trend has been particularly pronounced in job-oriented NFE, where more flexible, agile, and personalized forms of organized learning have been adopted across advanced capitalist countries (Lancaster, 2020; Wheeler, 2019).

Moreover, the average weekly working hours in Europe have decreased by 15% over the last two decades and the number of part-time jobs has doubled in many countries (ILO, 2022a), potentially reducing the significance of time-related barriers to AET and an important component of situational barriers. In addition to these societal changes, there is a growing demand for the development and validation of research tools to study the behavioral aspects of AET participation (Boeren, 2018, 2019). Currently, most empirical research in this field is qualitative and lacks a comprehensive set of validated and reliable research instruments that can be used within single-country research or cross-nationally to obtain more robust findings on AET participation and related phenomena, including perceived barriers.

1.1. Purpose of study

Given these two considerations—changes in environmental factors impacting perceived barriers to AET and the need for cross-national validation—we aimed to investigate the psychometric properties of the Non-participation in Non-formal Education Questionnaire (NP-NFE-Q) using nationally diverse cross-national data, including four European countries: Sweden, Germany, the United Kingdom, and the Czech Republic. Countries were purposefully selected to represent the most distinctive adult learning systems in Europe; they are characterized not only by various welfare state regimes, which, according to the literature (Rubenson & Desjardins, 2009) should distinguish the perception of barriers, but also based on documented variation in the empirical pattern of perceived barriers (Roosmaa & Saar, 2017). Therefore, a valid and reliable research instrument can be employed systematically in a broad international context.

Following the previous discussion, we propose two research aims:

(1) to cross-nationally validate the NP-NFE-Q purposefully in selected European countries.
(2) To examine the validity of the Patricia Cross's (1981) triadic typology of constraints in the context of changes in environmental factors influencing perceived barriers to AET.

We believe that this validation will not only provide a sound and reliable research tool for exploring perceived barriers to NFE, currently the most frequent form of AET (Desjardins & Ioannidou, 2020; Desjardins, 2017), but will also evaluate the validity of the Patricia Cross's (1981) triadic typology of barriers, which has been widely used in the adult education field in recent years.

1.2. Related research

One of the most commonly used scales in research on barriers is the Deterrents to Participation Scale (DPS), originally developed by Scanlan and Darkenwald (1984) and reconstructed by Darkenwald and Valentine (1985) to measure factors of deterrents to public participation in AET. Based on 215 households' responses, six factors including (1) lack of confidence, (2) lack of course relevance, (3) time constraints, (4) low personal priority, (5) cost, and (6) personal problems were classified as situational, institutional, and dispositional barriers in line with the Cross (1981) typology. This model has been further used as the basis for numerous empirical studies (Cabus et al., 2020; Roosmaa & Saar, 2017; Rubenson & Desjardins, 2009; Vaculíková et al., 2020; Van Nieuwenhove & De Wever, 2021b) using data from international comparative surveys. Further research by Valentine and Darkenwald (1990) described an empirically derived typology of adults, defined with respect to previously identified barriers. Since then, little progress has been made in research designed to capture the underlying constructs of these barriers empirically.

Generally, a number of scholars have agreed on the combined or synergistic effects of multiple factors that multicausally influence individuals' decisions to participate in NFE (e.g., Boeren, 2016; Darkenwald & Valentine, 1985; Kyndt et al., 2013; Rubenson & Desjardins, 2009). They encompass both psychological and social forces (Valentine & Darkenwald, 1990) and occur dominantly within a work-related environment (Desjardins, 2017; Rubenson, 2018). In addition, the primary data sources of international comparative approaches rely on surveys, such as AES (BMBF, 2014) and PIAAC (Desjardins, 2015; Rammstedt et al., 2016). However, these surveys fail to deliver a comprehensive and consistent picture of AET, and more recently, they address a specific problem in statistics in the form of varying adult AET participation rates depending on underlying data sources (Widany et al., 2019).

In response to an increasing body of evidence suggesting that perceived barriers to AET have been deemed a significant factor in organized adult learning (Boeren, 2016; Cabus et al., 2020; Desjardins, 2017; Hovdhaugen & Opheim, 2018; Van Nieuwenhove & De Wever, 2021a), the Non-participation in Non-formal Education Questionnaire (NP-NFE-Q) has been developed (Kočvarová et al., 2022). The analyzed item pool was delivered from a set of 56 semi-structured interviews conducted with purposefully selected cohorts: low-educated workers, persons caring for children under the age of three, and retired persons (Karger et al., 2021), and aligned with already existing items taken from the AES. Results based on a representative sample of the adult population, and the three typical groups of non-participants in NFE, consistently supported (CFI = .961, TLI =.949, RMSEA =.051, BIC = 413.396) a correlated five-factor structure, including two situational (*Work* and *Time*), one institutional (*Offer*), and two dispositional factors (*Needs* and *Worries*), as the most suitable model. This is in line with previous research showing that non-cognitive (situational and institutional barriers) and cognitive factors (dispositional barriers) interact with each other and represent multiple individual and structural factors that influence participation in NFE (Boeren, 2016; Desjardins & Ioannidou, 2020; Desjardins, 2017). Based on statistical and judgment criteria fulfilled within its initial validation (Kočvarová et al., 2022), the NP-NFE-Q represents a promising attempt to serve as a national or international measure of adults´ non-participation in NFE.

2. Methods

2.1. Participants
The research presented here was situated within the NFE, which can be defined as any further adult education outside the formal education system and involving organized activities that do not result in official certification (UNESCO, 2012). NFE typically includes courses, workshops, seminars, and private lessons that are mainly personal or job related (Eurostat, 2023). The research sample consisted of 1,884 non-participants in NFE drawn from a representative stratified random sample of adults aged 25–64 years from four European countries: Sweden, Germany, the United Kingdom, and the Czech Republic. Gender, age, education, region, and size of the overall population's residential location ratio were reflected in each country. Data collection was conducted by a specialized agency using the computer-assisted web interview method (CAWI) in the summer of 2022.

In all phases of the survey process, emphasis was placed on the ethical principles of research, especially anonymity, respecting the ICC/ESOMAR International Code (ESOMAR, 2016). Verbal informed consent was obtained from all participants. Further, participants were informed about the purpose of the data collection and that the given information would be treated confidentially. Finally, team members evaluated all research proposals with respect to their ethical implications, ensuring the safety and rights of the participants.

The participants were, on average, aged 47.62 years (*SD* = 11.01, Min. = 25, Max. = 64), and 50.3% were females. Data on the highest attained educational level showed that 22.9% of participants achieved ISCED Level 3 or 4, and 21.9% of participants achieved ISCED Levels 0 to 2. Furthermore, 19% had attained education at ISCED Level 5 or 6. Most participants were employed full-time

(44.7%), 13.9% were part-time employees, and 15.4% were retired. The detailed sociodemographic distribution of the participants is shown in Supplementary Table S1.

2.2. Measures

Barriers to participation in NFE: The 15-item NP-NFE-Q (Kočvarová et al., 2022) was used to assess the barriers that prevent adults from participating in NFE. This type of AET was introduced as a kind of education that is organized, intentional, and planned by an education provider. The four types of typical NFE include courses, private lessons, workshops or seminars, and guided on-the-job training. Respondents were asked to express their degree of agreement with situational barriers (for example, the item "I do not have time for further education because I have to take care of my children and family"), institutional barriers (for example, the item "Lack of suitable courses"), and dispositional barriers (for example, the item "I am afraid that you would not be able to handle further education"), which represent a correlated five-factor model. A 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree) was used, with a 12-month reference point for participation in AET. An overview of these items is provided in Supplementary Table S2.

Sociodemographic characteristics: Gender was a dichotomous variable that asked respondents whether they were male or female. Age was computed on the basis of the respondent's year of birth. For the measurement invariance analysis, respondents were assigned to two age categories: 25–44 years and 45–64 years. Educational background was measured using seven items corresponding to the ISCED level. Employment status covered a broad palette of activities from full-time employees to students or retirees.

2.3. Data analysis

All individual steps assessing the construct validity of the NP-NFE-Q were evaluated simultaneously based on statistical and judgment criteria, taking into account the theoretical framework as well as the practical usefulness of the instrument. The NP-NFE-Q was originally developed as a correlated five-factor scale (Kočvarová et al., 2021) that includes the dispositional, institutional, and situational dimensions of non-participation in adult education. Therefore, it is time to move to confirmatory factor analysis (CFA) to answer the question of whether the NP-NFE-Q has the same structure across certain populations or subgroups. Hence, we evaluate the factor structure using a series of samples and specific subgroups.

Based on recommendations following the ethical use of fit indices in structural equation modelling (Jackson et al., 2009; Stone, 2021), we decided to include absolute, incremental, and parsimonious fit indices. Therefore, the comparative fit index (CFI), Tucker—Lewis index (TLI), goodness of fit index (GFI), and root mean square error of approximation (RMSEA) were applied to assess the model's goodness of fit. The cut-offs for the CFI, TLI, and GFI indices were set at a value higher than .90 (≥.95 good), and the RMSEA cut-off point was set to an upper limit of .08 (≤.06 good), providing a fundamental indication of how well the proposed theory fits the data. We did not rely on the χ^2 statistic given its sensitivity to large sample sizes (Fabrigar et al., 1999). Cross-national validation was established when the model fit was at least acceptable, and if the majority of items had factor loadings of ≥.50 (Costello & Osborne, 2005).

In addition, using multi-group CFA, we examined whether the factor structure was measurement-invariant across nationality (four countries), gender (male and female), and age group (25–44 years and 45–64 years old). Configural (a qualitatively invariant measurement pattern of factors), metric (a quantitatively invariant measurement model of factors), and scalar (invariant mean levels of item intercepts) levels of invariance were evaluated (Xu & Tracey, 2017). We used the differences among the CFI values to interpret the results with ΔCFI ≤ .01, and increased RMSEA by not more than .015 relative to the configural model considered as a sign of invariance (Chen, 2007; Cheung & Rensvold, 2002). Reliability was assessed based on the

internal consistency of the full scale and subscale scores obtained from the CFA. McDonald's ω and Cronbach's α were compared, with a value of ≥.700 indicating good reliability (DeVellis, 2017). No missing data were included in this dataset.

3. Results

The first step of our analysis included descriptive statistics (Supplementary Table S2). The means of all 15 items ranged from 2.73 to 4.01 on a 6-point Likert scale, with a mean score of 3.26. The standard deviations ranged from 1.26 to 1.69, with values of kurtosis and skewness lower than ±2 (Trochim & Donnelly, 2006), suggesting acceptable data dispersion.

Across all samples, the item "SF8: It will not help me to improve my work position" ($M = 4.01$, $SD = 1.588$) and the item "SF9: It is not expected of me" ($M = 3.98$, $SD = 1.485$), originally falling under the Work factor, reached the highest level of agreement. On the contrary, the item "DF3: I think that I do not have sufficient education for further education" ($M = 2.73$, $SD = 1.538$) reached the lowest level of agreement, originally belonging to the Worries factor.

3.1. Structural validity of the NP-NFE-Q

Based on the theory (Rubenson, 2011, 2018) and research (Kočvarová et al., 2021) that suggests a five-factor structure of the NP-NFE-Q, we started with a series of CFAs across subsamples divided by country (Supplementary Table S3). However, an acceptable fit was not obtained (min. CFI, TLI, and GFI =.865, .823, and .899, max. RMSEA =.093). The majority of factor loadings were ≥.50 (between .36 and .85), except for low factor loadings within the factor Time (between .36 and .80). Notably, high covariances between the Needs and Work factors (between 1.08 and .81) appeared across all countries, showing estimation problems. Although fit indices provide a wide range of useful information about the data-model fit, reported procedures were also applied, along with the judgment criteria of the theoretical framework behind the factors, as well as the practical useful-ness of the instrument. On this basis, the structural validity of the original five-factor model seems to be weak.

Therefore, we decided to move from the research question, "Does the NP-NFE-Q have the same structure across certain populations?" to "What factor structure underlies NP-NFE-Q across certain populations?", with the aim of finding a uniform, cross-nationally stable factor structure for the NP-NFE-Q. In addition to an EFA and our consideration of the interpretable factor structure, we inspected the scree plot (Cattell, 1966) and performed a parallel analysis (Horn, 1965), as well as Wayne Velicer's minimum average partial (MAP) analysis (Velicer, 1976). An oblique promax rotation was applied (Whitney et al., 2019), and the .40–.30–.20 rule was adopted (Howard, 2016) to retain only satisfactory variables and eliminate cross-loadings. To find a unified accep-table structure for the instrument across countries, an EFA was conducted on a randomly split subsample ($n = 942$), referring to the calibration subsample (EFA), and a CFA was conducted on the other half ($n = 942$), referring to the validation subsample (CFA).

Parallel analysis and the number of factors with empirical eigenvalues higher than one identified four potential factors to be retained. However, visual inspection of the scree plot did not replicate this finding, suggesting a three-factor solution. Moreover, the results of the original and revised MAP analyses suggested two components to retain. Although a four-factor model was good according to the fit indices (CFI = .935, TLI =.914, RMSEA =.064, GFI =.956), the quality of the factors was poor. More specifically, after the removal of cross-loadings, the fourth factor consisted of less than three items. Hence, the four-factor solution was considered weak and unstable (Costello & Osborne, 2005). Therefore, we estimated the model for two- (as suggested by MAP analysis) and three- (as suggested by the scree plot) factor solutions.

The quality of the factors in the two-factor solution was considered good because both factors had at least three items per factor, and the majority of the factor loadings exceeded .50. However, the two-factor solution was poor according to all the fit indices (CFI = .848, TLI =.806, RMSEA =.111,

GFI =.899). The model fit of the three-factor solution (CFI = .947, TLI =.931, RMSEA =.062, GFI =.960) and the quality of the factor solution were good (all factor loadings ≥.50, Table 1). In summary, the results showed that the original five-factor model of the NP-NFE-Q, as well as the two- and four-factor solutions, did not fulfil quality requirements (see Supplementary Table S4) or judgmental criteria. At this point, testing the three-factor structure including Needs (five items), Worries (three items), and Offers (three items) as barriers to NFE was considered justified, and we decided to explore how the model holds within diverse subsamples divided by country.

The CFAs in all countries showed that the three-factor model had a good model fit (min. CFI, TLI, and GFI =.932, .908, and .941, max. RMSEA =.079), and the majority of factor loadings exceeded .50 with the average loading =.70 (see Supplementary Tables S4 and S1). More specifically, there was one factor loading (item SF9 within the United Kingdom subsample) lower than .50 (though not lower than .46). Given that the items' average loading across all countries was acceptable (.53) and the items had good discrimination power, we decided to keep this item within the scale. Overall, the three-factor model fit the data, and factor loadings confirmed the solid structural validity of the NP-NFE-Q in all countries.

3.2. Measurement invariance of the NP-NFE-Q

The next step included an evaluation of measurement invariance across country, gender, and age (Table 2). Across country groups, a change in model fit from the configural to the metric level (ΔCFI = −.007, ΔRMSEA = .000) indicated a non-significant decrease in model fit as a result of adding equality constraints. However, the difference in CFI between models at the scalar level was −.040, which is >.01 recommended by Cheung and Rensvold (2002). Consequently, we conclude that there is evidence of metric invariance across country groups; however, scalar invariance is not tenable.

The pooled sample showed measurement invariance with respect to gender and age up to the scalar level, indicating that the factor means were comparable across subgroups. Gender invariance was established in Germany, the United Kingdom, and the Czech Republic, whereby a change in model fit did not deteriorate the model at the scalar (or strong) level. The strongest decrease in CFI (ΔCFI = −.009) and the strongest increase in RMSEA (ΔRMSEA = .001) were observed in Germany and the Czech Republic. Although we can see the observed change in CFI close to the cut-off value of .01 (Chen, 2007), a sensitivity analysis was not performed because of the small sample size for all countries.

Age invariance was established in all the countries. Scalar measurement invariance was observed in Sweden, the United Kingdom, and the Czech Republic, and metric invariance was established in Germany. Notably, in both gender and age measurement invariance tests, TLI was not always well above the threshold values of a good model fit (≥.90); however, the other parameters were acceptable. Given that the pooled sample divided by country does not represent subgroups of a large sample size, some model fit indices (MFI) including TLI, tend to yield estimates that suggest a worse fit than the other MFI. As a result, we conclude that there is evidence of measurement invariance across males and females and younger (25–44 years) and older (45–64 years) respondents on the described levels. A detailed analysis of the invariance by country is presented in Supplementary Table S5.

3.3. Reliability of the NP-NFE-Q

In addition to an evaluation of the final model, Supplementary Table S6 shows reliability estimates, including McDonald's ω and Cronbach´s α of the model and each factor separately across the pooled sample and subgroups divided by country, gender, and age. The scales were expected to be respectable, with coefficients exceeding the value .700 (DeVellis, 2017). McDonald's ω point estimates ranged between .700 (United Kingdom) and .840 (Germany), and Cronbach´s α point estimates ranged between .701 (the subgroup aged 25–44 years) and .827 (Czech Republic), suggesting good reliability across all subgroups divided by country, gender, and age. Moreover,

Table 1. Summary CFA results of the three-factor model across all countries					
Factor	**Item***		**Min. loading[a]**	**Max. loading[b]**	**Average loading[c]**
Needs	SF10	It will not improve my work knowledge and skills in any way.	.73	.82	.79
	DF10	I do not need to acquire new knowledge.	.69	.80	.76
	SF8	It will not help me to improve my work position.	.52	.83	.68
	DF8	Further education does not give me the same personal satisfaction as other activities.	.65	.68	.66
	SF9	It is not expected of me.	.46	.61	.53
Worries	DF3	I think that I do not have sufficient education for further education.	.74	.82	.77
	DF13	I would be embarrassed not to know something.	.69	.74	.71
	DF2	I am afraid that I would not be able to handle further education.	.61	.83	.71
Offer	IF2	Lack of information about suitable courses.	.72	.84	.78
	IF1	Lack of suitable courses.	.62	.75	.70
	IF3	The quality of courses is usually rather low.	.51	.64	.58
Summary of loadings (11 items)			.63	.76	.70

Note:*Items are shown with their original abbreviations, with "IF" for Institutional Factor, "DF" for Dispositional Factor, and "SF" for Situational Factor (Kočvarová et al., 2021).

[a]Lowest observed factor loading across countries

[b]Highest observed factor loading across countries

[c]Average factor loading across countries

Omega´s lower bound of the confidence interval ranged between .628 (United Kingdom) and .809 (a pooled sample) and between .626 (Sweden) and .813 (45–64 years) for the lower bound of Alpha.

Table 2. Goodness of fit of invariance tests across gender and age					
Grouping variable	**Model fit**			**Change in model fit**	
	CFI	**TLI**	**RMSEA**	**ΔCFI**	**ΔRMSEA**
Country invariance					
Configural	.937	.916	.037		
Metric	.930	.918	.037	−.007	.000
Scalar	.890	.886	.043	−.040	.006
Gender invariance					
Configural	.947	.928	.047		
Metric	.946	.934	.045	−.001	−.002
Scalar	.940	.933	.046	−.006	.001
Age invariance					
Configural	.951	.934	.045		
Metric	.950	.939	.044	−.001	−.001
Scalar	.943	.936	.044	−.007	.000

Furthermore, we closely analyzed the individual item reliability statistics of Item SF9 across all the measured subsamples (see Supplementary Table S7). All countries, except the United Kingdom, reported a decrease in McDonald's ω and Cronbach´s α if the item was eliminated from the scale. This result points to good internal consistency of the factor, including the tested item. Moreover, the item-rest correlation ranged between moderate $r = .425$ (United Kingdom) and large $r = .548$ (Czech Republic). Overall, the item reliability and correlation analysis adequately supported the connection of Item SF9 with this factor. Therefore, these findings suggest that all 11 items substantially contribute to the underlying construct of the barriers to participation in NFE.

4. Discussion

To the best of our knowledge, the present study is the first to systematically analyze the psychometric properties of a novel questionnaire, the NP-NFE-Q, across nationally diverse samples of adults in four purposefully selected countries: Sweden, Germany, the United Kingdom, and the Czech Republic. This study aimed to conduct a cross-national validation of this instrument to measure factors that prevent the adult population from participating in NFE.

However, the presented results did not reflect a good model fit between the correlated five-factor model proposed by Kočvarová et al. (2022) and observed data. Therefore, a pooled sample ($n = 1,884$) was randomly divided into two datasets. An EFA was conducted on the first dataset ($n = 942$) to provide insight into the latent factors underpinning the questionnaire. Subsequently, CFAs and reliability analyses were conducted for the second dataset to validate the retrieved structure.

Findings from the pooled sample, as well as adult learners from separate countries who did not participate in NFE during the last 12 months, showed that the newly delivered factor structure of the NP-NFE-Q has good psychometric properties within a broad international context and demonstrates its suitability for cross-national comparisons of barriers to NFE. First, the CFA confirmed the good structural validity of the 3-factor structure, including work and life-related needs for NFE, and Worries and Offers as barriers to NFE, across the pooled sample and all countries. Second, the internal consistency of the items was good for all the subsamples. Third, the factor structure was measurement-invariant across countries (metric invariance) using a pooled sample of respondents. This finding indicates that the measured barriers in NFE have similar meanings in the investigated countries. Moreover, gender and age invariance were observed in the pooled sample up to the scalar level. This implies that males and females, as well as adults aged 44 years and

older (45–64 years), interpret the NP-NFE-Q in a similar manner and that the scale is able to measure the same underlying construct across subsamples (Davidov, 2010). Hence, the scale is suitable for measuring and comparing adult levels of barriers in international surveys. On this basis, as a next step, future research assessing the potential reasons for country-level differences in perceived barriers to participation in NFE looks promising.

Age invariance (scalar in Sweden, the United Kingdom, and the Czech Republic, and metric in Germany) was established in all countries. In the case of gender, scalar invariance was found in all nationalities except Sweden. These findings imply that the NP-NFE-Q measures the same underlying construct for males, females, 25–44 years old, and 45–64 years old. Therefore, researchers can use the scale to accurately identify which of these subgroups are at high risk for selected barriers, which is important given the predominance of NFE within lifelong learning.

Although we report some discrepancies in measurement invariance by country, gender invariance was not only established in the Swedish subsample. The reasons for this result might vary from a relatively small sample size, including 201 males and 178 females, which simply lacks sufficient information, to the specifically strong impact of the social democratic welfare state regime in Sweden, which successfully mitigates gender differences in perceived barriers (Roosmaa & Saar, 2017; Rubenson & Desjardins, 2009). Additionally, the presented findings may stem from the challenges of collecting large samples, leading to small differences becoming noninvariant (van Dijk et al., 2022). This might be the case of reported metric measurement invariance across countries using a pooled sample. To verify these suggestions, future studies comparing the psychometric properties of the NP-NFE-Q with samples of different sizes are recommended.

Beyond that, we also explored the validity of Patricia Cross's (1981) triadic typology of barriers. Contrary to her conception (Cross, 1981; Rubenson & Desjardins, 2009), the results indicate factorial inconsistency between the empirical and theoretical models. First, dispositional barriers tended to dominate among current non-participants in NFE in the selected countries, forming two key factors: Worries and Needs. While the factor Worries is in line with the previous operationalization of dispositional barriers, mainly targeting the issue of self-efficacy and the lack of confidence among non-participants (Darkenwald & Valentine, 1985; Valentine & Darkenwald, 1990), the factor Needs is more complicated. It brings together items that measure work-related situational factors in the initial version of the NP-NFE-Q and items focused on the absence of educational needs and satisfaction regarding participation in NFE. The latter also represents a typical dispositional barrier connected to meaningless participation (Cross, 1981) and low personal priority (Darkenwald & Valentine, 1985). Because all these items are covered by an absence of perceived educational needs in both work-related settings and in general, we label this factor as Needs. In this regard, we do not propose that they are independent attributes of the individual, but rather dispositions in the sense of internalized schemas of the perception of the value of organized learning, heavily influenced by adults' childhood socialization, life world, and working conditions (Kondrup, 2015; OECD, 2016; Paldanius, 2007). As a result, our findings indicate a larger role for items measuring the dispositional aspects of non-participation in this empirical model of barriers.

Second, time-related factors were no longer included in the present study. In this case, we argue that the reduced significance of time-related barriers is a probable outcome of shifts in the labor market and nature of work, including an increase in part-time employment (ILO, 2022a), as well as the current shift towards remote and hybrid work arrangements by many employers (ILO, 2022b). Additionally, the implementation of more flexible, agile, and personalized forms of organized learning in the form of microlearning and instruction through learning management systems (Lancaster, 2020; Wheeler, 2019) may support the insignificance of this type of barrier among the general adult population.

To strengthen the participation rate of adult learners and overcome the barriers that prevent adults from participating in AET, NFE needs to represent a valuable transition and the

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improvement of work knowledge as well as life skills. Therefore, NFE should involve the satisfaction of both work- and life-related needs, space to overcome worries, and creation of an offer that can fit into the continuously changing demands of work and life.

4.1. Strengths and limitations

The present study has several strengths related to the inclusion of nationally diverse subsamples from the four European countries. However, this study has some limitations that should be acknowledged. First, the results reported in this study are based on self-reports, which may be partly biased owing to the social desirability of the respondents. Second, the cross-sectional design of this study precludes the possibility of investigating test-retest reliability and predictive validity of the scale. Moreover, criterion validity was not tested due to the lack of other related constructs in the survey. Third, this study included only European adults. Fourth, the current factor structure of NP-NFE-Q does not represent the comprehensive coverage of all influencing factors involved in the field of NFE. Considering these limitations, more validation research on the NP-NFE-Q, using longitudinal data and data from non-European countries, is warranted to extend our knowledge about the psychometric properties of the NP-NFE-Q.

Despite the research limitations listed above, the NP-NFE-Q showed good structural validity by means of a good model fit for a 3-factor model and the high factor loadings of the items. Therefore, based on the present results, the NP-NFE-Q is reliable, valid, and comparable across many nationalities, thereby facilitating future research on the barriers to participation in adult education.

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