Development and Initial Validation of the Nonparticipation in Nonformal Education Questionnaire

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Abstract

Nonformal adult education (NFE) provides adults with the opportunity to obtain competences needed to adapt to today's changing job market. Despite the well-documented positive effects of NFE, there remains a lack of valid research instruments to assess factors of nonparticipation. Specifically, defining the perspectives of social groups with the highest incidence of barriers and the lowest level of participation in NFE has not been a primary research goal. This study describes the development and initial validation of a novel research tool entitled the Nonparticipation in Nonformal Education Questionnaire (NP-NFE-Q). The analysis covers the use of the NP-NFE-Q on a representative sample of the adult population (n = 878) as well as three additional cohorts: low-educated workers (n = 227), persons caring for children under the age of three (n = 227), and retired persons (n = 232). The results consistently support the validation of a correlated five-factor model, which includes two situational, one institutional and two dispositional factors.

Keywords: nonformal education, lifelong learning, barriers to participation in adult education, factor analysis

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Nonformal adult education (NFE) has been described in various policy documents (Organization for Economic Co-operation and Development [OECD], 2018, 2019; United Nations Educational, Scientific and Cultural Organization, 2019, 2020) and research studies (Boeren, 2016; Rees, 2013; Regmi, 2015) as a key component of lifelong learning. NFE can be defined as any further adult education that occurs outside formal education settings and involves structured activities that do not result in official certification according to the International Standard Classification of Education (ISCED, 2011), which typically include courses, distance learning, private tuition, and guided on-the-job training (Cedefop, 2008; European Statistical Office, 2016). Although these educational activities may not be directly job-oriented, they generally occur in the work environment, which has become the main domain of NFE in recent years (Desjardins, 2017; Rubenson, 2018).

In most countries, two to three times more adults over the age of 24 years are engaged in NFE every year as compared to formal adult education. NFE has been described as a primary source of dynamism in today's knowledge economies (Iversen & Soskice, 2019) as well as an efficacious tool to increase the competitiveness of individuals in the labor market and enhance their adaptability to social change (Boeren, 2016; Busemeyer & Trampusch, 2012; OECD, 2018, 2019). It has also been identified as an effective means of promoting health, civic and cultural engagement and thus

contributing to overall sociopolitical trust (Iñiguez-Berrozpe et al., 2020). NFE is

particularly relevant today as societies are facing difficult challenges associated with

institutional responses to the COVID-19 pandemic (Boeren et al., 2020; Rambla &

Milana, 2020; Waller et al., 2020).

Despite the positive outcomes of NFE programs, a number of social groups

remain significantly underrepresented (Desjardins, 2017; Kalenda et al., 2020; Kyndt et

al., 2011; Van Nieuwenhove & De Wever, 2021). Three populations in particular have

shown low participation: adults with low education levels, the elderly, and persons

taking care of young children. Each of these groups is distinguished by a specific set of

features that makes its members vulnerable, potentially decreasing their desire and

opportunity to become involved in education and training. Several authors (Dämmrich

et al., 2015; Desjardins et al., 2006; Desjardins & Ioannidou, 2020; Iñiguez-Berrozpe et

al., 2020) have described the crucial importance of reducing these negative effects.

Most *low-educated adults* are employed in areas with a high risk of automation

(e.g., manufacturing, accommodation, food services, wholesale and retail). According to

the latest McKinsey report on the future of work in Europe (Smith et al., 2020), 51

million workers are at risk for at least the partial automation of their jobs. Low-educated

adults are most threatened by changes in the labor market associated with the

obsolescence of skills, the precarization of work, and the risk of unemployment (Berger

& Frey, 2016, Brynjolfsson & McAfee, 2014). Moreover, these adults also have

generally had a lack of positive experience with previous education (Rubenson, 2011,

2018). Employers are generally less willing to invest in enhancing the skills of this

population as compared to higher-educated workers (Kyndt et al., 2011).

The elderly are challenged by the fast pace of social change represented by

digitalization. This population often has not developed (to a sufficient degree) the

digital literacy necessary to master the everyday skills needed to fully participate in contemporary society (United Nations Educational, Scientific and Cultural Organization, 2019, 2020). Moreover, due to the dominant tendency of NFE towards job-oriented learning, the number of opportunities for participation sharply declines after individuals have entered into retirement (Rubenson, 2018). These factors often make the situation of older adults quite precarious, decreasing their level of engagement with the wider society. Greater inclusivity for this population would be made possible through their participation in NFE.

Persons taking care of young children face several issues. The responsibilities of childcare bring many situational constraints into the lives of these individuals, many of which are female. Moreover, when they do (re)enter the workplace, especially in the professions and other knowledge-intensive careers, these individuals may find it difficult to keep up with the continuing education demanded in certain jobs (Dämmrich et al., 2015).

To further complicate matters, gender discrimination can exacerbate risk factors in all the groups mentioned above. As indicated, many women have fewer opportunities for NFE due to their commitment to family-related responsibilities. Women have also been shown to face lower support from employers (e.g., due to perceptions in many cultures regarding the traditional social roles of women). These factors have been found to negatively affect the motivation of women towards participation in NFE. Finally, the NFE programs that women participate in are generally less work-related than those that men engage in (Albert et al., 2010; Boeren, 2011; Vaculíková et al., 2020). In exploring barriers to participation in NFE, increased emphasis should be placed on factors related to gender as well as how these factors intersect.

Barriers to participation and related theoretical factor structures

In her ground-breaking work *Adults as Learners. Increasing Participation and Facilitating Learning* (1981)*,* K. Patricia Cross theorized three independent types of barriers to adult learning: (1) *dispositional*, (2) *situational*, and (3) *institutional*. This framework has become the basis for numerous empirical studies in the forty years since the book's publication.

Dispositional barriers are usually understood as personal constraints connected with attitudes towards learning and self-perceptions which influence an individual's willingness to participate in NFE. In comparison, situational and institutional barriers represent structural obstacles. Situational barriers arise directly from life situations (e.g., employment, economic resources, family obligations, health, disposable time for learning, etc.). Institutional obstacles are typically connected to the provision of NFE, mainly in terms of practices that can prevent adults from participating (e.g., lack of accessibility, lack of information).

Cross's typology was partially corroborated by Darkenwald and Valentine (1985; see also Valentine & Darkenwald, 1990), whose theoretical conception, although never fully validated, was used in a number of empirical studies (see Courtney, 1992; Hovdhaugen & Opheim, 2018; Roosmaa & Saar, 2017; Rubenson & Desjardins, 2009; Van Nieuwenhove & De Wever, 2021). This conception remains the basis for the classification of barriers in international surveys such as the Programme for the International Assessment of Adult Competencies (PIAAC) and the Adult Education Survey (AES).

A number of scholars (e.g. Boeren, 2016; Desjardins, 2017; Kyndt et al., 2013; Rubenson, 2011; Rubenson & Desjardins, 2009) agree that nonparticipation in NFE is multi-causally influenced, with both cognitive (dispositional) and non-cognitive (situational and institutional) factors playing a role. In addition to established

typologies, more recently some researchers (Desjardins, 2017; Rubenson, 2011, 2018) have described how the *accessibility of NFE* as well as *quality of information about NFE* may also represent significant independent factors with regard to participation. The basis for this view lies in the argument that information concerning organized learning activities represents a crucial precondition for decision-making about involvement in NFE. According to this model, institutional barriers related to information regarding NFE may influence adults more strongly than situational or dispositional obstacles (Baert et al., 2006; Boeren, 2016).

In addition, other relatively recent studies (Hovdhaugen & Opheim, 2018; Roosmaa & Saar, 2017) have accentuated the view that *economic reasons* for nonparticipation should not be classified as situational factors – the view taken by Cross (1981) – but as institutional factors. According to these findings, economic factors depend more on policies and programs supporting adult education (Rubenson & Desjardins, 2009; Rubenson, 2011) rather than strictly on the financial resources available to adults in a given situation. Other authors (Darkenwald & Valentine, 1985; Larson & Milana, 2006; Valentine & Darkenwald, 1990) argue for the classification of financial and economic constraints as independent barriers that more profoundly affect the most vulnerable social groups.

Despite the intensive theoretical discussion on the factors influencing nonparticipation in NFE and adult education in general, many key issues require further study (Merriam & Baumgartner, 2020). The primary sources of knowledge about NFE remain the surveys PIAAC and AES. Several issues can be identified in these instruments: (1) they contain only a few items measuring barriers to participation; (2) a number of certain factors are not measured at all, for example dispositional factors (Van Nieuwenhove & De Wever, 2021); (3) these research tools focus on constraints that lower the involvement of adults

in NFE, but they do not assess obstacles that prevent participation altogether (Hovdhaugen & Opheim, 2018; Rubenson, 2011). Besides the PIAAC and AES, few other research tools that can be used for this purpose have been validated (Darkenwald & Valentine, 1985; Valentine & Darkenwald, 1990). Furthermore, these instruments target the entire adult population, failing to consider differences among social groups, especially populations who face the highest number of barriers. Some tools focus solely on participation factors and not at all on constraints against participation (Blunt & Yang, 2002; Boeren & Holford, 2016; Boeren et al., 2012; Mulenga & Liang, 2008).

Study aim

The main objective of this study is to describe the development of a novel research tool entitled the Nonparticipation in Nonformal Education Questionnaire (NP-NFE-Q) and to present an evaluation of the face validity and construct validity of the instrument. Within this context we seek to empirically verify whether nonparticipation in NFE can be described in a basic three-factor structure, as indicated in previous literature (e.g. Cross, 1981), or whether other factors should also be identified and taken into account, as has been suggested by more recent studies (Rubenson, 2011, 2018).

Additionally, the study aims to (a) evaluate the construct validity of the questionnaire for three typical groups of non-participants in NFE: low-educated workers, persons caring for children under the age of three, and retired persons over 60 years of age; (b) evaluate the measurement invariance of the tool across gender; and (c) evaluate the overall reliability of the instrument.

Regarding the structure of this study, first we describe the development of the NP-NFE-Q including information about the research samples and analyses. The results of our own application of the questionnaire are then presented, followed by a discussion

of certain limitations of the present research as well as potential directions for future investigations.

Method

The development phase of the research project consisted of a set of 56 semi-structured interviews conducted with low-educated workers (n = 21), persons caring for children under the age of three (n = 17) and retired persons over 60 years old (n = 18). In these interviews we sought to deepen our knowledge regarding non-participants in NFE by focusing on patterns of respondent interpretations, emotions, biographies and life conditions associated with NFE. Detailed results from this phase of the project are included in a manuscript currently submitted for publication (Karger et al, 2021).

With this qualitative research we were able to determine a number of categories and codes from which the questionnaire items were created. Items reflecting non-participation barriers applicable to all groups of non-participants were compared and in some cases aligned with already existing items taken from the AES. Following this process, we added other questionnaire items in line with the theory-driven situational, institutional and dispositional factors described above.

The research team carefully evaluated and connected 16 well-fitted items aligned with the AES to our 13 newly created items based on the interviews. A draft questionnaire with a total of 29 items was drawn up, with all items based on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). An overview of the items in the draft of the NP-NFE-Q is presented in Supplementary Table 1 and Supplementary Figure 1. The table includes sources (AES or our semi-structured interviews) for each item and full descriptions of the items. The figure contains the theoretical structure, confirmed structure, basic factor descriptions as well as the items saturating each factor.

The questionnaire was distributed to a representative sample of the target population (see section: Research sample) to obtain the data for initial validation. Face validity of the NP-NFE-Q was repeatedly assessed by the research team by focusing on the content and logical cohesion of the questionnaire. Great care was taken to ensure that the integrity of the original three-factor structure (e.g. Cross, 1981) was preserved from the initial drafts to the final version of the instrument. Based on more recent research (Rubenson, 2011, 2018), a breakdown of these three factors into a number of more specific factors was considered acceptable. The newly created factors were assessed in terms of internal composition, mutual cohesion as well as cohesion with the overall focus of the questionnaire.

Construct validity of the NP-NFE-Q was evaluated using typical psychometric analytical procedures for scale development and validation: exploratory and confirmatory factor analysis (EFA, CFA), correlations, and reliability estimates (DeVellis, 2017; Furr, 2018). These procedures are described below in the section *Analysis*. The final model of the questionnaire was evaluated with regard to the three specific groups of respondents, gender invariance as well as overall reliability (see Section Results).

Research sample

Data collection was conducted in the Czech Republic during June 2020 by a specialized agency. Trained interviewers across the country addressed selected persons based on the Computer Assisted Personal Interviewing (CAPI) method. When respondents fell into the target group and agreed to participate in the research, they were verbally asked questions, with their responses recorded on a digital device by the interviewers.

The agency collected a representative stratified random sample of non-

participants in NFE (n = 878) in which the gender, age and education ratio of the overall population was reflected (Czech Statistical Office, 2014). For the purposes of analysis, this sample was randomly divided into two separate sample groups. Sample 1 (n = 439) was used for conducting EFA, Sample 2 (n = 439) for CFA.

Quota samples from the three specific groups were also collected. Sample 3 (n = 227) contains low-educated workers with primary or secondary school education without a secondary school leaving exam (up to ISCED 3c). Sample 4 (n = 227) comprises persons caring for children under the age of three. Sample 5 (n = 232) contains retired persons over 60 years old.

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). The socio-demographic distribution of the five samples can be found in Table 1.

Table 1. Socio-demographic characteristics of the five research samples.

Data analysis

All analytical procedures were applied along with judgmental criteria which took into account the theoretical framework as well as practical usefulness of the tool. The analysis was carried out in IBM SPSS 27.0 with IBM SPSS AMOS 27.0. We also used JASP 0.14.1.0 to conduct parallel analysis as well as the calculation of McDonald's ω and Gutmann's λ^6.

In the first step, descriptive statistics including the means, standard deviations, skewness and kurtosis of each item were calculated. EFA using the principal axis factoring (PAF) extraction method was performed on the item correlation matrix of Sample 1. As the correlated factor structure was assumed, oblique (intercorrelated)

promax rotation was applied (Whitney et al., 2019). To retain satisfactory variables, the .40–.30–.20 rule was adopted (Howard, 2016). Furthermore, Cattell's scree plot (Cattell, 1966) and parallel analysis (Horn, 1965) were used to determine the number of factors to retain. Pearson's correlation with a Bonferroni correction was used to control for multiple testing. To evaluate reliability, Cronbach's α, McDonald's ω, and Gutmann's λ^6 were compared.

Next, a series of CFAs of the factor structure of the NP-NFE-Q as obtained in EFA was performed on Sample 2. The final model was verified on Samples 3, 4 and 5. Measurement invariance across gender was evaluated as well as the reliability of the final solution.

Results

Our results are presented in terms of the aims of this study as described above. The main objective is reflected in the following three sections, which present an exploration of the NP-NFE-Q factor structure, an evaluation of the structure, and an examination of interrelationships among the factors. Following these sections, we focus on our three additional aims: (1) construct validity of the NP-NFE-Q in terms of the three specific groups; (2) measurement invariance across gender, and (3) reliability of the final instrument.

Exploring the factor structure of the NF-NPE-Q

We began with descriptive statistics to check the data before applying the other analytical procedures. The means of all 29 items ranged from 2.61 to 4.54 (on a scale 1 – 6), with a mean score of 3.60. The values of the standard deviations (SD) of all items ranged from 1.28 to 1.78, with a mean of 1.51. The skewness and kurtosis of all the items did not exceed the value of ±2 (Trochim & Donnelly, 2006), suggesting

acceptable data dispersion.

Before applying EFA, the suitability of the data was checked. The Kaiser-Meyer-Olkin measure (KMO) of sampling adequacy was .89, exceeding the commonly recommended minimal cut-off value of .60. Bartlett's test of sphericity ($x^2_{(406)} =$ 5,888.72, $p < .001$) supported the factorability of the correlation matrix.

Based on oblique promax rotation, the examination of the scree plot suggested a five-factor structure, as did the parallel analysis. After comparing these findings with the theory, the five-factor structure was adopted. The initial three-factor (dispositional, situational, institutional) structure was split into five factors while retaining the original framework of the tool, as described in detail below.

A total of 23 items were chosen to remain based on the results of EFA. Out of these items, five scales were created which accounted for 48.75% of the variance, with eigenvalues of 8.49, 3.14, 2.07, 1.59, and 1.33 respectively. The factor loadings and descriptive statistics of each item as well as reliability coefficients are presented in Supplementary Table 2.

The first subscale consisted of ten items assessing factors of nonparticipation in the form of personal *Needs*. These included the general lack of pleasant feelings toward learning as well as indications by the respondent of no need to be educated. The second subscale labelled *Offer* included three items reflecting the low quality of courses, the lack of suitable content, and the lack of information about courses. The third subscale comprised three items related to *Work* (the respondent's job position, no need for further education at the respondent's place of employment, no expectation of further education). The fourth subscale assessed three items connected to *Time* (no time for further education based on commitments to work, family, hobbies). The fifth subscale labelled *Worries* contained four items representing fear of failure and other negative

self-perceptions with regard to education.

Evaluating the factor structure of the NP-NFE-Q

Based on the results of EFA conducted on Sample 1, CFA was carried out on Sample 2 to determine how well the a priori model retained from EFA fit the sample data. Based on common recommendations (Hooper et al., 2008), the comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA) were applied to determine the goodness of fit of the model. The cut-offs for the CFI and TLI indices were set at a value higher than .90 (Hooper et al, 2008). The RMSEA cut-off point was set to an upper limit of .070 (Steiger, 2007). Finally, the values of the Bayesian information criterion (BIC) were used to compare the models, with the lowest value indicating the best model fit (Kass & Raftery, 1995).

CFA was first performed on the correlated five-factor model (Model 1) with 23 items retained from EFA, however an acceptable fit was not shown (CFI = .859, TLI = .838, RMSEA = .083, BIC = 1218.245). The next steps of modelling were based on the statistical criteria (modification indices, model fit) as well as judgmental criteria (a comparison of each item's content with the other items along with an overall conceptualization of the tool) of the model purification (Wieland et al., 2018). Based on previous discussions on correlated errors in structural equation modeling (Gerbing & Anderson, 1984; Hermida, 2015), a purified model containing only the strongest items with no covariations among their error terms was preferred. The practical benefits of this method were brevity and clear interpretability along with higher applicability potential to specific groups without the need to adapt the model. As part of the purification of the tool, we focused on item reductions. Before the elimination of each particular item, it was carefully assessed with regard to the content of the questionnaire and the factors associated with it.

The largest number of item reductions had to be made in the *Needs* factor. Additional inspection showed the presence of a highly correlated subgroup of items (DF1, DF4, DF9 and DF11) which formed a specific sub-construct within the factor. Due to the low logical cohesion of this subgroup, we decided to remove the items from the model. In the next step, the three statistically as well as judgmentally weakest items IF6, DF6, and DF12 were dropped, reducing the first subscale *Needs* to the three strongest items: DF7, DF8 and DF10. In addition, the item SF4 in the *Worries* subscale showed low factor loading (below .40). Reflecting the overall content of this factor, the item was evaluated as too specific and was removed. The revised correlated five-factor model (Model 2) which retained a reduced number of 15 items was tested. This model fulfilled the statistical (CFI = .961, TLI = .949, RMSEA = .051, BIC = 413.396) as well as judgmental criteria described above.

Examination of the interrelationships among the NP-NFE-Q factors

The internal division of items into factors preserved the theoretically intended structure: dispositional (*Needs* and *Worries*), institutional (*Offer*) and situational (*Work* and *Time*). As part of the main objective of this study, our intention was to empirically verify whether this three-factor structure (see Figure 1) could serve as the basis for the NP-NFE-Q. A correlation analysis (see Supplementary Table 3), however, did not fully support a three-factor structure. Using Cohen's (1988) conventions to interpret effect sizes, the correlation between *Needs* and *Worries* was moderate ($r = .47$, $p < .001$), while the correlation between *Work* and *Time* was small ($r = .13$, $p < .001$). Thus, the correlation analysis did not fully support the connection of the *Work* and *Time* subscales into one situational factor. On the contrary, the correlations of the five dimensions with the overall construct were large ($r = .50$ to $.74$, $p < .001$), which suggested the possibility of connecting all the subscales into one overall construct. In addition to the

current five-factor model (Model 2), two other variants were composed and tested by CFA: one featuring a connection of five factors into three (Model 3), the other connecting five factors into one second-order factor (Model 4). A basic graphical presentation of the three potential structures of interrelationships among the factors of the NP-NFE-Q can be found in Figure 1.

Figure 1. Potential structures of the interrelationships among the factors of the NP-NFE-Q.

The five-factor structure has been presented above (Model 2). As the next step, an attempt was made to compose and test a second-order three-factor structure (Model 3). The factors *Needs* and *Worries* were connected into one second-order dispositional factor (DF); *Offer* represented the institutional factor (IF); *Needs* and *Worries* were connected into one second-order situational factor (SF). As the model fit indices of this version proved to be worse (CFI = .947, TLI = .933, RMSEA = .058, BIC = 431.828), the three-factor solution was rejected. As a final step, we attempted to construct and test a second order one-factor model (Model 4) connecting the five factors into one broader overall factor: *Barriers*. The quality of this model also proved worse in comparison to Model 2 (CFI = .943; TLI = .930; RMSEA = .060; BIC = 429.981), so it was also rejected. All of these results of CFA regarding model fit are displayed in Table 2.

Table 2. Goodness of Fit statistics in CFA for Sample 2 (n = 439).

Although Models 3 and 4 produced a good fit, Model 2 yielded the best fit (see Table 2), so Model 2 was accepted based on the model's fit indices as well as its simplicity and wide intelligibility. A graphical representation of all models with the estimated parameters of each can be found in Supplementary Figure 2.

Evaluating construct validity for the three specific groups

To fulfill the first additional aim of this study, Model 2 was tested separately for each of the three specific groups of non-participants in NFE: (a) low-educated workers (Sample 3), (b) persons caring for children under the age of three (Sample 4), and (c) retired persons over 60 years old (Sample 5). The results showed stability across all the samples (CFI > .900; TLI > .900; RMSEA < .070). This indicates a qualitatively invariant measurement pattern of factors for Model 2, thus the questionnaire can be applied both to the general adult population and to the three specific groups. These results can be found in Table 3.

Table 3. Goodness of Fit of Model 2 for samples 3 (n = 227), 4 (n = 227), and 5 (n = 232).

Measurement invariance of the NP-NFE-Q across gender

To fulfill the second additional aim of this study, we used Sample 2 to evaluate the NP-NFE-Q in terms of measurement invariance across gender. Three levels of invariance were evaluated (Xu & Tracey, 2017): configural (a qualitatively invariant measurement pattern of factors), metric (a quantitatively invariant measurement model of factors) and scalar (the invariant mean levels of item intercepts). These results are presented in Table 4.

Table 4. Goodness of Fit of the invariance tests of Model 2 for Sample 2 (n = 439).

In line with Cheung and Rensvold (2002), the differences among the values of CFI were used to interpret the results (with values lower than 0.01 considered as a sign of invariance). The biggest difference was shown between the configural and metric levels (ΔCFI = 0.006), with no difference found between the metric and scalar levels. Thus we may conclude that Model 2 of the NP-NFE-Q is invariant across gender up to

the scalar level. At this level of measurement invariance, the factor means can be compared.

Reliability of the NP-NFE-Q

In addition to presenting the final model, Supplementary Table 4 summarizes the reliability coefficients for samples 2, 3, 4 and 5. Although reliability is sample size sensitive, and the model does contain a relatively small number of scale items, the subscales were expected to be reliable with coefficients exceeding the value .70 (DeVellis, 2017). Although the values we obtained were not always well above the recommended acceptable range, we consider the obtained values satisfactory in terms of how they reflect expert discussions regarding the usefulness of reliability coefficients with scales containing a low number of items (Sijtsma, 2009; Taber, 2018).

Discussion

With this research study we aimed to create and initially validate a questionnaire to measure factors that prevent the adult population from participating in NFE. In the construction of this novel questionnaire – the NP-NFE-Q – we sought to address the lack of an instrument to measure educational barriers from an assessed perspective (Boeren, 2018, 2019). In line with current research (Roosmaa & Saar, 2017; Rubenson, 2011, 2018; Rubenson & Desjardins, 2009; Van Nieuwenhove & De Wever, 2021), a correlated five-factor solution was finally identified as most suitable. The incorporation of non-cognitive factors (*Offer*, *Work*, and *Time*) with cognitive factors (*Needs* and *Worries*) is consistent with arguments regarding the multiple individual and structural factors that influence participation in NFE (Boeren, 2016; Desjardins, 2017; Desjardins & Ioannidou, 2020).

The importance of the pioneering work of Cross (1981) in terms of introducing

questions related to why adults participate (or not) in educational programs cannot be denied. In particular her identification of three independent types of barriers to adult learning serve as a useful starting-off point for further research. Nevertheless, our results indicate that the structure of barriers can be described in a more complex way. Barrier construction and perception, for example, has been significantly connected to the context of employment (see the factor *Work* above). The increasing prevalence of job-related learning in contemporary NFE has influenced recent theory linking work conditions to adult nonformal education (Desjardins & Ioannidou, 2020; Rubenson, 2018).

Our results do not empirically confirm the strict use of Cross's three-factor model as it was originally presented in the 1980s. The five-factor solution we have put forward might be integrated into a more general model which complements the three original categories proposed by Cross (see Figure 1). In this context, our factor of *Offer* represents institutional barriers to NFE; *Work* and *Time* can be related to situational obstacles; and *Needs* and *Worries* correspond to various aspects of dispositional barriers.

Whereas some authors (Darkenwald & Valentine, 1985; Larson & Milana, 2006; Valentine & Darkenwald, 1990) have proposed the influence of the independent factor of financial barriers, our results indicate that this factor does not play a significant role. One possible explanation for this lies in the high financial support of NFE by employers, which has been previously demonstrated in other research as specific to the Czech Republic (Kalenda & Kočvarová, 2020). As a consequence, the lack of financial resources does not seem to form a substantial barrier to participation, at least not in the Czech context. Some previous studies (Desjardins, 2017; Rubenson, 2011, 2018) have pointed out that information availability about NFE should represent another

independent factor. Our data support connecting availability with information about NFE and its quality into the one factor *Offer*.

Another important finding of our study is the suitability of the NP-NFE-Q for the three specific groups of non-participants in NFE we identified. In addition, measurement invariance was found across gender and the instrument was evaluated as reliable. One more advantage of this tool is that it employs a concise and clear factor structure (i.e., results can be quickly and easily interpreted in practical usage). The questionnaire can be administered in diverse lifelong settings and across various samples by researchers and adult education specialists, for example within companies by HR professionals, among managers and lectors as well as by employers seeking to invest in the skills enhancement of their employees (Kyndt et al., 2011). The tool is also applicable for counseling purposes within the framework of social services for low-educated adults, the elderly as well as individuals caring for children, who may face unemployment, social exclusion, etc.

A rapid evolution is taking place in the types and causes of barriers to adult NFE. Although the relatively simple three-factor structure of barriers created by Cross (1981) once worked well, the issues involved are becoming more complex, as new dimensions of barriers are being identified and the specifics of different groups are changing. These include questions regarding the inclusivity of potentially marginalized populations such as workers facing unemployment in the digital economy (Desjardins, 2017; Roosmaa & Saar, 2017; Rubenson, 2018; Hovdhaugen & Opheim, 2018). We hope that our novel, empirically verified research tool along with the knowledge presented here in our study can be used not only in the Czech Republic but also internationally. The NP-NFE-Q can be further modified or extended to further identify, describe and verify barriers towards

adult participation in NFE. The NP-NFE-Q might be used to supplement data from other surveys or as an alternative measurement tool.

Limitations and directions for future research

First, by no means does the current five-factor version of the NP-NFE-Q represent full and comprehensive coverage of all the variables and factors underlying lifelong learning or even nonparticipation in NFE. Several groups of researchers have provided evidence that other factors may become prominent in the future, especially in the years to come as many economies continue to adapt to Industry 4.0 (fourth industrial revolution in the sense of digitalization, automation and related changes in the labor market). As an example of these evolving perspectives, even within the verification process of our questionnaire the financial situation was originally reflected among the situational (SF4) as well as institutional (IF4) barriers. Finally neither of the associated items was retained in the final Model 2 due to their specificity. Other specific barriers such as health issues (represented by item SF3) and the distance of NFE from the place of residence (SF7) also did not fit into the factor structure. As indicated, it is clear that the factor structure of the current NP-NFE-Q may be supplemented or modified in the future on the basis of further reconstruction and re-validation of the tool. It would also be possible to develop specialized surveys reflecting particular target populations and / or specific sets of barriers to participation in NFE.

Another limitation to our study is its basis on research findings from the perspective of one country. Though we generated a representative sample, the research in this respect lacked cultural diversity, which may influence the generalizability of the results. It is anticipated that further utilization of the NP-NFE-Q in various contexts across diverse cultural samples will yield reliable and repeatable results.

In our study, the use of the term "initial validation" accentuates the fact that this

work does not represent a comprehensive validation. The full validation of the tool will entail a gradual, long-term process through many research projects based on various judgmental as well as statistical criteria. Concurrent validity of the NP-NFE-Q is not evaluated here, as no related standardized instruments were applied. Nor was the question of predictive or other kinds of validity addressed in this study. All of these research targets may be included in the further development and validation of the NP-NFE-Q.

Despite the research limitations listed above, the authors hope that the development of the current version of the NP-NFE-Q will serve as a useful step toward addressing a significant gap in the literature by facilitating more specifically targeted research into nonparticipation in NFE.

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Table 1. Socio-demographic characteristics of the five research samples.

Variables	Representative stratified samples				Quota samples					
	Sample 1 (*n* = 439)		Sample 2 (*n* = 439)		Sample 3 (*n* = 227)		Sample 4 (*n* = 227)		Sample 5 (*n* = 232)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Gender										
Male	206	46.9	216	49.2	114	50.2	44	19.4	98	42.2
Female	233	53.1	223	50.8	113	49.8	183	80.6	134	57.8
Age										
18-24	44	10.0	39	8.9	13	5.7	40	17.6	0	0.0
25-34	66	15.0	63	14.4	41	18.1	89	39.2	0	0.0
35-44	83	18.9	70	15.9	59	26.0	88	38.8	0	0.0
45-54	65	14.8	69	15.7	59	26.0	9	4.0	0	0.0
55-64	72	16.4	92	21.0	51	22.5	1	0.4	24	10.3
65 and more	109	24.8	106	24.1	4	1.8	0	0.0	208	89.7
Educational attainment level										
ISCED2	75	17.1	87	19.8	30	13.2	21	9.3	11	4.7
ISCED3c	172	39.2	163	37.1	197	86.8	69	30.4	73	31.5
ISCED3a,b	146	33.3	134	30.5	0	0.0	83	36.6	87	37.5
ISCED5,6	46	10.5	55	12.5	0	0.0	54	23.8	61	26.3
Main employment status										
Full time	214	48.7	190	43.3	183	80.6	44	19.4	0	0.0
Part time	11	2.5	16	3.6	26	11.5	5	2.2	0	0.0
Self-employed person, freelancer	21	4.8	44	10.0	18	7.9	4	1.8	0	0.0
Performing domestic tasks, family caregiver	5	1.1	1	0.2	0	0.0	1	0.4	0	0.0
Unemployed	12	2.7	14	3.2	0	0.0	2	0.9	0	0.0
Pupil, student, further training, unpaid work experience	14	3.2	11	2.5	0	0.0	0	0.0	0	0.0
Retired over age 60	143	32.6	148	33.7	0	0.0	0	0.0	232	100.0
Parental leave	18	4.1	15	3.4	0	0.0	169	74.4	0	0.0
Prefer not to answer	1	0.2	0	0.0	0	0.0	2	0.9	0	0.0

Note. ISCED = International Standard Classification of Education.

Table 2. Goodness of Fit of CFAs for Sample 2 ($n = 439$).

Model	No.	x^2	df	CFI	TLI	RMSEA	BIC
1. Correlated five-factor model	23	877.513	220	.859	.838	.083	1218.245
2. Revised correlated five-factor model	15	170.016	80	.961	.949	.051	413.396
3. Second-order three-factor model	15	206.702	83	.947	.933	.058	431.828
4. Second order one-factor model	15	217.023	85	.943	.930	.060	429.981

Note. No. = number of items; χ2 = Chi-Square statistic; df = degrees of freedom; $p < .001$.

Table 3. Goodness of Fit of the Model 2 for samples 3 (n = 227), 4 (n = 227), and 5 (n = 232).

Sample	x^2	df	CFI	TLI	RMSEA
Sample 3: low-educated workers	149.943	80	.952	.936	.062
Sample 4: persons caring for children	156.019	80	.936	.916	.065
Sample 5: retired persons	156.404	80	.946	.929	.064

Note. $p < .001$.

Table 4. Goodness of Fit of Invariance Tests of the Model 2 for the Sample 2 ($n = 439$).

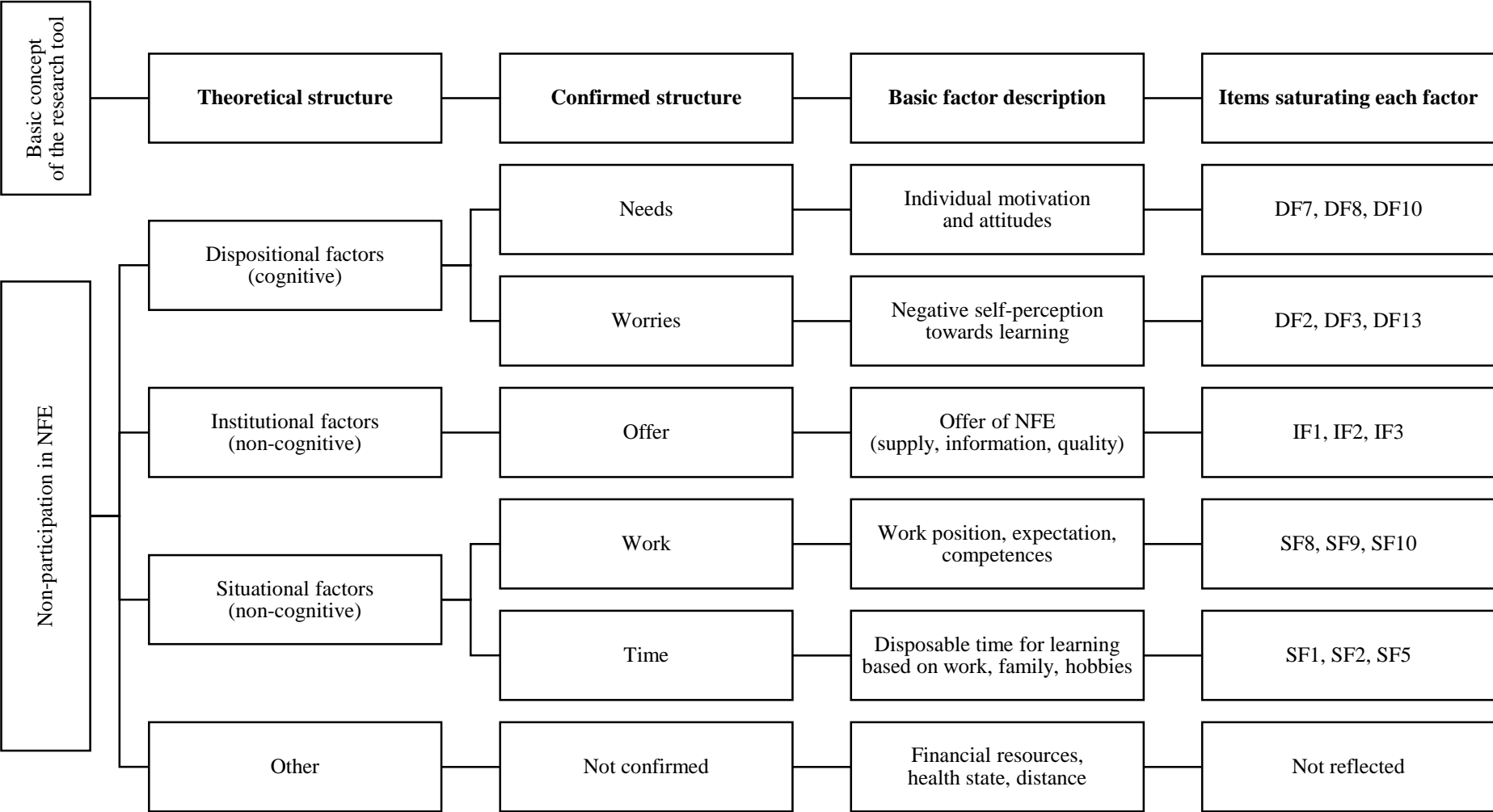| Invariance test	x^2	df	CFI	ΔCFI	TLI	RMSEA
Configural	254.259	160	.960	-	.948	.052
Metric	278.755	170	.954	.006	.943	.054
Scalar	288.892	180	.954	.006	.946	.052

Note. $p < .001$.

Supplementary Table 1. Overview of the NP-NFE-Q items including their sources, description, theoretical and confirmed factor structure.

Source of item	Theoretical structure	Item description	Confirmed structure
AES (2007-2016)		SF1: I have a lot of hobbies, so I do not have time for further education.	Time
AES (2007-2016)		SF2: I am too busy at work.	Time
AES (2007-2016)		SF3: I cannot participate for health reasons.*	
AES (2007-2016)	Situational factor (SF)	SF4: I cannot afford it financially at the moment. **	
AES (2007-2016)		SF5: I do not have time for further education because of duties regarding my children and family.	Time
AES (2007-2016)		SF6: My employer does not support me in further education. *	
AES (2007-2016)		SF7: The courses are held too far from where I live. *	
semi-structured interviews		SF8: Based on these activities I will not improve my job position in any way.	Work
semi-structured interviews		SF9: It is not expected of me.	Work
semi-structured interviews		SF10: It will not improve my work knowledge and skills in any way.	Work
AES (2007-2016)		IF1: There are not enough suitable courses.	Offer
AES (2007-2016)		IF2: There is not enough information about suitable courses.	Offer
AES (2007-2016)	Institutional factor (IF)	IF3: The quality of courses is usually relatively low.	Offer
AES (2007-2016)		IF4: The courses offered which I would be interested in are too expensive. *	
AES (2007-2016)		IF5: I do not have a certificate that would allow me to complete the course I am interested in. *	
semi-structured interviews		IF6: I am not interested in the content of the education or training being offered. **	
AES (2007-2016)		DF1: I have no need to be educated. **	
AES (2007-2016)		DF2: I am worried that I will not be able to handle further education.	Worries
AES (2007-2016)		DF3: I don't think I have enough educational background for further education.	Worries
AES (2007-2016)		DF4: Participating in educational courses or training does not make sense to me. **	
semi-structured interviews		DF5: I am not interested in the content of the education or training being offered. *	
semi-structured interviews	Dispositional factor (DF)	DF6: During educational activities, it is not satisfying to share my thoughts with others. **	
semi-structured interviews		DF7: Further education does not evoke any pleasant feelings in me.	Needs
semi-structured interviews		DF8: Further education does not bring me the personal satisfaction that I get from other activities.	Needs
semi-structured interviews		DF9: Learning new things is not enjoyable. **	
semi-structured interviews		DF10: I do not need to acquire any new knowledge.	Needs
semi-structured interviews		DF11: Further education will not help me to achieve my life goals. **	
semi-structured interviews		DF12: Further education is not important for success in society. **	
semi-structured interviews		DF13: As a participant in further education, I would be ashamed that I do not know something.	Worries

Note. AES = Adult Education Survey. * Item was removed from the model according to the results of EFA as well as judgmental criteria. ** Item was removed from the model according to the results of CFA as well as judgmental criteria.

Supplementary Figure 1. Theoretical and confirmed structure of the NP-NFE-Q including basic factor description and items saturating each factor.

Basic concept of the research tool	Theoretical structure	Confirmed structure	Basic factor description	Items saturating each factor
Non-participation in NFE	Dispositional factors (cognitive)	Needs	Individual motivation and attitudes	DF7, DF8, DF10
		Worries	Negative self-perception towards learning	DF2, DF3, DF13
	Institutional factors (non-cognitive)	Offer	Offer of NFE (supply, information, quality)	IF1, IF2, IF3
	Situational factors (non-cognitive)	Work	Work position, expectation, competences	SF8, SF9, SF10
		Time	Disposable time for learning based on work, family, hobbies	SF1, SF2, SF5
	Other	Not confirmed	Financial resources, health state, distance	Not reflected

Supplementary Table 2. Pattern Matrix of the NP-NFE-Q for the Sample 1 ($n = 439$).

Item description	F1	F2	F3	F4	F5	h^2	M	SD	α-i
DF7 : Further education does not evoke any pleasant feelings in me.	**.78**	.05	.01	-.02	.06	.71	3.87	1.44	.89
DF1 : I have no need to be educated.	**.76**	-.05	.15	-.08	.00	.66	4.05	1.48	.89
DF8 : Further education does not bring me the personal satisfaction that I get from others.	**.73**	.05	.16	.04	-.09	.61	4.09	1.36	.89
DF4 : Participating in educational courses or training does not make sense to me.	**.70**	-.07	.16	-.08	.03	.62	4.06	1.50	.91
DF10 : I do not need to acquire any new knowledge.	**.67**	-.02	.07	-.13	.10	.57	3.73	1.51	.90
DF11 : Further education will not help me to achieve my life goals.	**.62**	-.04	.22	-.05	.04	.59	4.03	1.50	.90
IF6 : I am not interested in the content of the education being offered.	**.60**	.22	.05	.06	-.13	.47	3.94	1.40	.90
DF6 : During educational activities it is not satisfying to share my thoughts with others.	**.58**	.14	-.05	.07	.14	.58	3.57	1.39	.90
DF12 : Further education is not important for success in society.	**.55**	-.01	.16	.04	.17	.53	3.69	1.51	.90
DF9 : Learning new things is not enjoyable.	**.51**	.01	-.20	.06	.21	.43	2.92	1.43	.91
IF1 : There are not enough suitable courses.	.09	**.86**	-.08	.03	-.06	.57	3.24	1.38	.62
IF2 : There is not enough information about suitable courses.	.11	**.62**	.02	.01	.06	.45	3.48	1.41	.72
IF3 : The quality of courses is usually relatively low.	.13	**.58**	-.09	.14	-.03	.43	3.02	1.28	.76
SF8 : Based on these activities I will not improve my job position in any way.	.16	-.02	**.72**	.09	-.04	.61	4.38	1.56	.79
SF10 : It will not improve my work knowledge and skills in any way.	.25	-.06	**.72**	.12	-.01	.67	4.27	1.52	.77
SF9 : It is not expected of me.	.21	-.04	**.71**	-.04	.00	.55	4.54	1.41	.84
SF2 : I am too busy at work.	-.06	-.08	.07	**.78**	-.02	.38	3.41	1.67	.58
SF5 : I do not have time for further education because of duties regarding my children and family.	-.02	-.01	-.01	**.61**	.03	.32	3.15	1.65	.63
SF1 : I have a lot of hobbies, so I do not have time for further education.	-.05	.07	.05	**.57**	-.03	.34	3.41	1.52	.61
DF2 : I am worried that I will not be able to handle further education.	.30	-.17	-.06	.09	**.61**	.51	3.33	1.56	.63
DF3 : I don't think I have enough educational background for further education.	.25	.05	-.15	.09	**.58**	.53	3.11	1.55	.64
DF13 : As a participant in further education, I would be ashamed that I do not know something.	.22	-.04	-.04	.07	**.55**	.44	3.13	1.58	.66
SF4 : I cannot afford it financially at the moment.	-.12	.18	.08	.04	**.53**	.42	3.44	1.56	.77
Factor label	Needs	Offer	Work	Time	Worries			Together	
No. of items	10	3	3	3	4			23	
M	3.80	3.25	4.39	3.32	3.25			3.63	
SD	1.07	1.13	1.32	1.28	1.17			.80	
Explained variance in %	27.66	9.12	5.52	3.52	2.92			48.75	
McDonald´s ω	.91	.79	.86	.70	.75			.90	
Cronbach´s α	.91	.78	.86	.70	.74			.89	
Gutmann´s λ^6	.91	.71	.81	.61	.70			.93	

Note. Extraction method: principal axis factoring. Rotation method: promax with Kaiser normalization. Factor loadings in bold represent items loadings onto their primary factor. F1-5 = factor, h^2 = communalities, M = mean, SD = standard deviation, α-i = Cronbach´s α if the item is deleted.

Supplementary Table 3. Correlations between NP-NFE-Q subscale scores and the full scale.

| Subscales	Needs	Offer	Work	Time	Worries
Needs					
Offer	.292**				
Work	.512**	.291**			
Time	.087**	.297**	.129**		
Worries	.467**	.285**	.255**	.155**	
Together	.736**	.648**	.693**	.502**	.667**

Note. **p < .001. Correlations are based on Revised correlated five-factor model (Model 2).

Supplementary Table 4. Reliability coefficients of Model 2 for Samples 2 - 5.

Sample	Subscales	Reliability coefficients		
		McDonald's ω	Cronbach's α	Gutmann's λ^6
Sample 2	Needs	.798	.795	.729
(n = 439)	Offer	.787	.772	.705
	Work	.850	.846	.790
	Time	.659	.651	.558
	Worries	.797	.790	.727
	Together	.792	.801	.861
Sample 3	Needs	.845	.833	.788
(n = 227)	Offer	.864	.861	.809
	Work	.786	.776	.708
	Time	.642	.642	.552
	Worries	.819	.815	.757
	Together	.860	.864	.904
Sample 4	Needs	.845	.833	.788
(n = 227)	Offer	.864	.861	.809
	Work	.786	.776	.708
	Time	.642	.642	.552
	Worries	.819	.815	.757
	Together	.844	.844	.885
Sample 5	Needs	.845	.833	.788
(n = 332)	Offer	.864	.861	.809
	Work	.786	.776	.708
	Time	.642	.642	.552
	Worries	.819	.815	.757
	Together	.851	.852	.898

Supplementary Figure 2

Evaluated factor structures of Models 1 to 4
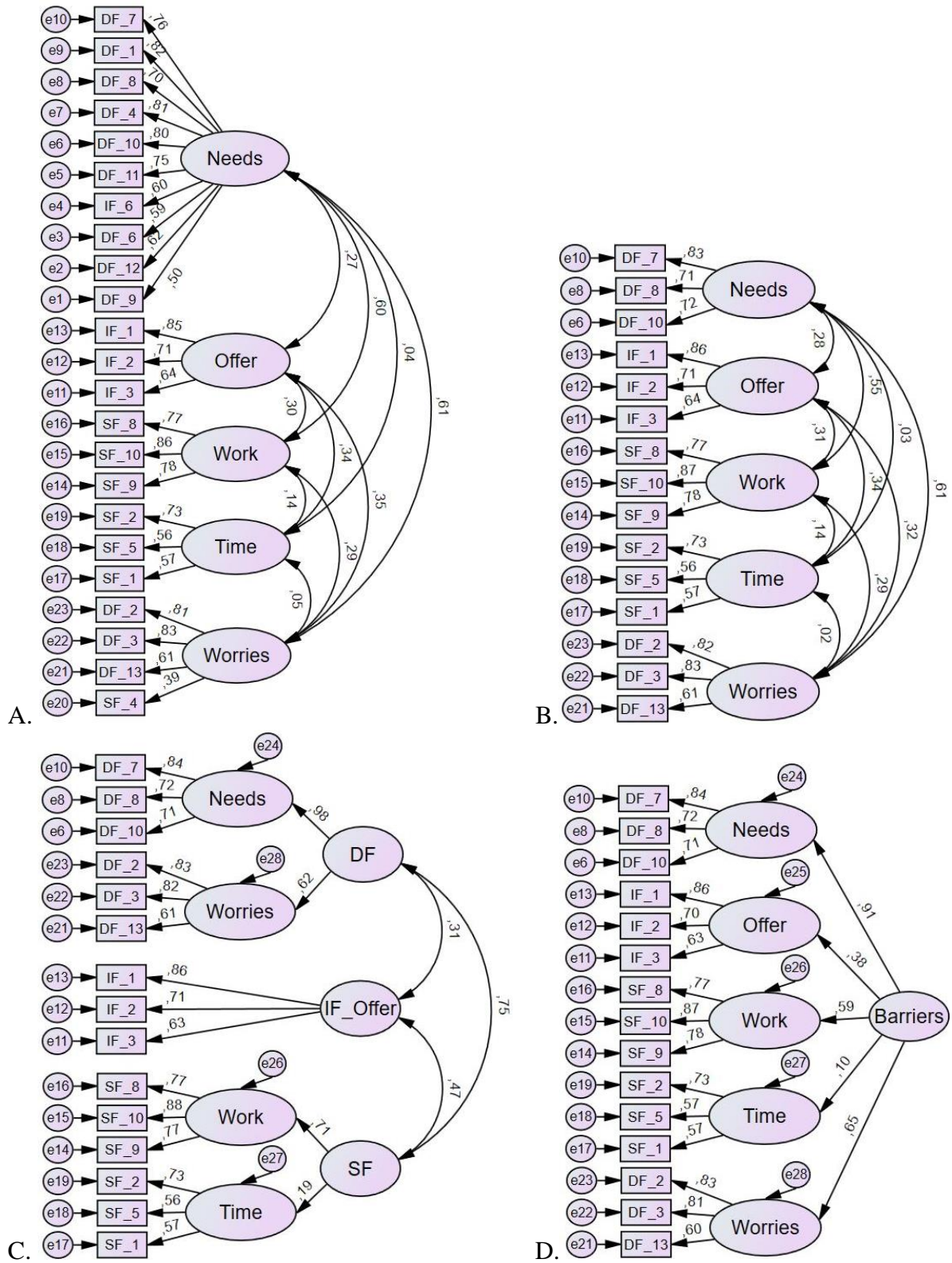
Note. A = Correlated five-factor model (Model 1); B = Revised correlated five-factor model (Model 2);
C = Second-order three-factor model (Model 3); D = Second order one-factor model (Model 4).