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Article

An approach to understanding financial behavior in three different age groups

Botond Géza Kálmán[1,2,3,4], Zoltán Zéman[5,*], Irma Potháczky Rácz[6], Szilárd Malatyinszki[1,2], Erzsébet Németh[7]

[1] Department of Economics and Management, Faculty of Economics, Kodolányi János University, Székesfehérvár 8000, Hungary
[2] Institute of Economic Research, Faculty of Economics, Kodolányi University of Applied Sciences, Székesfehérvár 8000, Hungary
[3] Department of Finance and Accounting, Faculty of Economics, John von Neumann University, Kecskemét 6000, Hungary
[4] Institute of Economics and Finance, Budapest Metropolitan University of Applied Sciences, Budapest 1148, Hungary
[5] Doctoral School of Management and Business Administration, John von Neumann University, Kecskemét 6000, Hungary
[6] Department of Management and Marketing, Kautz Faculty of Economics, Széchenyi István University, Győr 9026, Hungary
[7] Institute of Communication, Budapest Metropolitan University of Applied Sciences, Budapest 1148, Hungary
*** Corresponding author:** Zoltán Zéman, zeman.zoltan@nje.hu

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Abstract: A comprehensive survey was conducted in 2012 and 2020 to assess the financial culture of Hungarian higher education students. The findings revealed that financial training effectiveness had not improved over time. To address this, a conative examination of financial personality was initiated by the Financial Compass Foundation, which gathered over 40,000 responses from three distinct age groups: Children, high school students, and adults. The study identified key behavioral patterns, such as excessive spending and financial fragility, which were prominent across all age groups. These results informed Hungary's seven-year strategy to enhance financial literacy and integrate economic education into the National Core Curriculum. The research is now expanding internationally with the aim of building a comparative database. The study's main findings highlight the widespread need for improved financial education, with more than 80% of adults demonstrating risky financial behaviors. The implications of these findings suggest the importance of early financial education and tailored interventions to foster long-term financial stability. The international expansion of this research will allow for the examination of country-specific financial behaviors and provide data-driven recommendations for policy development.

Keywords: financial behaviour; motivations; questionnaire; validation; international research

1. Introduction

The self-created survey that has been accessible on the Money Compass Foundation website since 2015 is presented in this publication. In addition to offering respondents guidance on how to enhance their financial personalities and decision-making abilities, the questions helped us create a picture of financial personalities. Financial personality refers to an individual's unique way of interacting with and making decisions about financial matters. This includes behaviors and attitudes toward saving, spending, investing, and managing risk. Financial personality is shaped by personal traits such as reactivity, conscientiousness, thriftiness, and risk-taking. In our study, we measure financial personality by examining these traits and how they manifest in everyday financial activities, such as paying bills, making purchases, and managing savings.

Financial culture is defined as the norms, values, and knowledge within a society or group regarding how money is handled and financial decisions are made. It encompasses the collective financial behaviors and attitudes developed and

transmitted through education, societal norms, and family dynamics. Our research aims to analyze how financial culture influences individual financial decisions and behaviors across different age groups and how this culture can be improved through educational initiatives.

In response to the popularity of the adult questionnaire, we created two distinct questionnaires. These were made available on the Compass Foundation website: One for children starting in 2018 and another for secondary school students in 2021. We made the decision to offer the questionnaires, which are now only available in Hungarian, in multiple languages on the Compass Foundation website due to the considerable interest demonstrated by the ongoing responses and the influence of our international partners. We studied the literature before creating the international version; as this is empirical study, we will only quickly discuss the most significant trends. After that, we go into the methodology and the findings from the more than 40,000 questionnaires that have been completed since the study's start. Lastly, we talk about our findings and potential future study areas.

Despite extensive research on financial behavior and personality, there is still limited understanding of how these aspects differ across various age groups. Previous studies have primarily focused on single age groups or examined financial behavior without considering the influence of age-specific personality traits. This creates a research gap that hinders a more nuanced understanding of financial behavior across the lifespan. Our study aims to fill this gap by analyzing financial personality in three distinct age groups: Children, secondary school students, and adults. By examining these groups in parallel, we can identify both age-specific and universal factors that influence financial decision-making, thereby contributing to a deeper understanding of how financial behaviors develop and change over time.

2. Literature review

Personality has an impact on financial behaviour, decision-making, and the connection to finance. Research on the connection between these two fields has been conducted for about 50 years. Early research has used a personality-based approach to financial behaviour (Chen and Volpe, 1998; Danes and Hira, 1987). Subsequent research has viewed financial decisions and activities as capacities and has focused on financial knowledge-behavior-attitudes (Klapper et al., 2018; Lusardi and Mitchell, 2014). The original Hungarian research likewise went in this route (Németh et al., 2013). The database developed by Demirgüc-Kunt and colleagues in 2014 and updated in 2018 measures the material manifestations of financial decisions at the global level (Demirgüc-Kunt et al., 2015, 2018). Examples of these manifestations include owning a bank account and using a bank card. Regretfully, no fresh report on the topic will be released in 2021, despite initial plans. A third avenue of inquiry is now being explored. This focuses exclusively on financial personality as a phenomenon in and of itself, rather than inferring financial behaviour and attitudes from broader personality qualities. The representatives of this trend seek dimensions from which the structure of financial personality can be sketched. This evolving perspective aligns with recent studies on financial behavior, such as those by Kálmán and Szőke (2024), which emphasize the role of individual and contextual

factors in shaping financial behavior among tertiary students. Financial behavior is the sum of all forms of behavior that an individual implements while solving financial tasks. This includes making financial decisions, conducting transactions, shopping, internet banking and mobile banking, taking out insurance, financial investments, but also concluding consumer or other contracts. Everyday activities such as savings and paying bills on time can also be classified in this circle. Some of the behaviors are repetitive, such as paying bills, making thoughtful purchases, forming regular savings to secure the future, or checking account turnover. These are the basis for continuous financial security and a personal financial safety net. Savings help smooth the waves of finances, balance expenses and create the foundations of financial resilience and help an individual achieve their financial goals. Perhaps the most extensive survey of financial behavior is carried out by the World Bank every three years. The results of the 2011–2014–2017 surveys are available so far, the data for 2020 have not yet been published by the World Bank. The Global Findex database compiled by them is the world's most comprehensive data set on how adults save, borrow, pay and manage risks in 140 countries around the world (Demirgüc-Kunt et al., 2015, 2018, 2022). Following this course, our study group in Hungary, under the direction of Erzsébet Németh, began by examining the financial personalities of kids, adults, and secondary school students. We published our findings in the summer of 2022. Additionally, the interplay between financial behavior and larger societal or organizational dynamics, such as intellectual capital and knowledge sharing, has been highlighted by studies on human resource management and controlling systems (Szőke and Garamvölgyi, 2020; Szőke et al., 2016). These dimensions further underscore the multidimensional nature of financial personality and its implications for financial decision-making and planning.

It is important to note that while our review of the existing literature is concise, it has been carefully curated to highlight the most relevant trends that directly influence our empirical work. The selected studies provide a solid foundation for understanding the theoretical and practical contexts of financial behavior and personality. By focusing on these central trends, we avoid unnecessary details and ensure that our study maintains clarity and direction. The brief overview does not, therefore, undermine the thoroughness of our analysis but rather strengthens the connection between key theoretical foundations and our empirical investigation. Our intention has been to offer a concise yet sufficient context to support the methodological and practical contributions of this research, thereby bridging the gap between previous studies and our findings.

3. Materials and methods

3.1. The questionnaires

For our investigation, we created three questionnaires on our own. The statements that made up the questions were developed based on our own research experience as well as the literature. We looked at conduct, activity, and decision-making from the perspective of the financial personality. One of the most often studied topics in financial psychology is decision making (Sipos and Tóth, 2006). The Financial Compass Foundation made the questions available on its website.

According to research ethics, the questionnaire is optional and anonymous, and it doesn't ask respondents' gender or place of residence or ask about any other personal information. Based solely on the age group of the respondent who filled out the questionnaire, age group might be ascertained. The three questionnaires' questions were modified to reflect the target age group's age-specific features, being careful to avoid making negative statements regarding bad behaviours. On a five-point Likert scale, respondents were asked to rate how relevant each statement was to them. Five was 'very normal' and one was 'not at all typical' for each response. Nearly half of the statements in each of the three questionnaires were constructed so that the most unfavourable outcome would be the maximum score for that statement. "Money just flows out of my hands" is an example of a query like this. It is impossible to characterize the financial behaviour of individuals who fully concur (5 points). Reverse questions are denoted with the letter R. Prior to the study, four personality dimensions were established for children, five for children in secondary education, and six for adults based on the questions. The questionnaire's questions were all categorized into a single dimension. The questions that described a single dimension had their scores added together. Prior to summing, the scores of questions with a R were multiplied by −1. We were able to assign a score to each respondent's financial personality by adding together their scores across all dimensions. We also offered a reason to finish the survey: Upon responding to the questions, participants received an instant evaluation of their financial personality, which was determined by their performance in the pre-established areas of personality traits. After responding to the questionnaire, two categories were established for each dimension: Low (below median) and high (above median) scores. These were explained in detail, and each respondent received a score based on how they performed in each category. **Table 1** provides a summary of the three questionnaires' primary characteristics.

Table 1. Overview of questionnaire-based research across different educational groups.

	Primary education	**Secondary education**	**Adults**
Available since	2018	2021	2015
No of questions	20	30	36
No of predefined dimensions	4	5	6
No of respondents until 2022	15,933	4471	22,933
Method	online questionnaire, 5-grade Likert-scale		
Research ethics	voluntary and anonymous responses, no demographic data		
Motivation to complete	instant profile after completing the questionnaire		

We reevaluated the technique and made a few small adjustments to the scoring system prior to becoming global. The questions on the questionnaire, their sequence, or the evaluation of the responses that have been gathered thus far have not been impacted by these modifications. The adjustments were made using statistical techniques.

One of the most important issues with a questionnaire is reliability. The goal of every researcher is to measure some phenomenon with the questionnaire he uses and analyze the results. Therefore, it is important to determine whether the questions measure the phenomenon that is intended to be measured. The Cronbach-α value is calculated to answer this question. According to its generally accepted usage, reliability can be stated in the case of a Cronbach-α value above 0.7 (Bonett and Wright, 2015). However, the reality is more nuanced than that (T. Kárász et al., 2022) showed that the value of Cronbach's α is influenced by the size of the sample or the number of items in the scale of the given variable. They also draw attention to the fact that establishing a single specific threshold contradicts the fact that Cronbach's A confidence interval is often calculated in the case of an excessively low Cronbach-α value the authors of the study also took these considerations into account when interpreting the Cronbach-α value they calculated themselves.

The other statistical method was factor analysis. This analysis is usually presented in three forms in statistical software: Principal Component Analysis (PCA), Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The goal of all three methods is to combine variables. With this method, the high number of variables can be reduced without losing the meaningful information carried in the variables. PCA takes into account the total variance and combines it with the highest variance into the fewest possible factors (Cansiz, 2021). EFA focuses on common variance. It is used in cases where the variables or the variance are not known. And CFA is used to check a ready-made factor structure (Petrovics, 2014).

We examined the internal consistency (Cronbach's α) of the questions measuring each variable and performed confirmatory factor analysis of the predefined personality dimensions. This measure was used to assess the internal consistency and reliability of the questionnaire items across different age groups. Cronbach's α is a widely accepted method for testing reliability, and values above 0.7 generally indicate acceptable reliability (Bonett and Wright, 2015). However, in some cases, particularly with shorter scales, slightly lower α values can still be considered acceptable, as indicated by recent studies (T. Kárász et al., 2022). For our study, Cronbach's α was calculated for each personality dimension, allowing us to ensure that the questionnaire reliably measured the financial behaviors and traits we sought to examine.

Principal Component Analysis (PCA) was utilized to reduce the number of variables while retaining as much of the original information as possible. By focusing on variance, PCA helped us condense the large number of questionnaire items into a smaller set of uncorrelated components. This is crucial in financial personality research, as it allows us to highlight the most significant factors affecting behavior without overcomplicating the model (Cansiz, 2021).

Exploratory Factor Analysis (EFA) was applied to explore the underlying structure of the data, especially when the relationship between variables was unclear. This method focuses on the common variance shared between items and was used in cases where we needed to identify latent factors that contributed to the financial personality dimensions (Petrovics, 2014). EFA was especially valuable in the earlier stages of our research, before finalizing the factor structure.

After determining the underlying structure through EFA, CFA was employed to validate this structure. CFA allowed us to confirm whether the predefined factors—based on both the literature and our own hypotheses—accurately fit the data. This is a more stringent method than EFA, as it tests whether the identified factor structure holds up in different samples, ensuring robustness and generalizability of the findings (Petrovics, 2014).

3.2. The sample

Since 2015, the adult questionnaire has always been accessible. A total of 22,933 completed questionnaires had been gathered by the time processing began. Since it became available in 2018, 15,933 respondents have completed the children's questionnaire. The most recent survey is intended at students in secondary education. Since its introduction in 2021, 4471 respondents have filled out this questionnaire. Using the central limit theorem, we can infer the sample's normalcy given the large number of items in the age categories (Polya, 1920). The representativeness of our sample cannot be verified or disputed due to the design of the questionnaire and the sample collection process. Nonetheless, the reality remains that broad inferences can be made despite the large number of components. The financial personality scores can be used to describe the sample's descriptive statistics as there were no questions about demographic traits. We offer the children's sample descriptive statistical histogram (**Figure 1**) as an example, as we have begun processing the surveys using the new methodology.

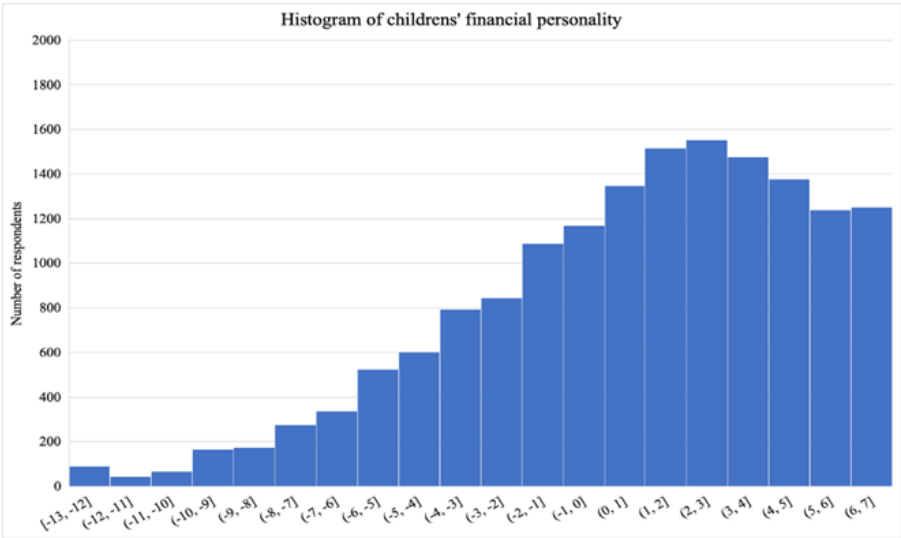

Figure 1. Financial personality of children.

The key takeaway from the histogram is that most kids outperform the median, which means that overall, the sample of kids is more favourable than the average personality qualities that are theoretically predicted.

4. Results and discussion

4.1. Results of the methodological review

Given that the theoretical structure of all three questionnaires is the same and only the number of questions differs between the age groups, the results of the children's questionnaire are presented as an example. **Table 2** contains the internal consistency values of the variables.

Table 2. Internal consistency of personality and its dimensions.

Dimension (factor)	**Cronbach's α**
Thrifty	0.622
Diligent	0.398
Conscious	0.553
Moderate	0.624
Financial personality (full)	0.787

As an attitude survey, our study's acceptable lower bound for Cronbach's α is, per the literature (T. Kárász et al., 2022), 0.5, rather than the typically expected value of 0.7. The overall personality construct's Cronbach's α score is higher than the typical value of 0.7, indicating that all dimensions met the expected results.

The analysis of the factors is the following query. In actuality, the predetermined personality dimensions match the findings of a theoretical component analysis. As such, we must investigate the degree to which the sample itself demonstrates a posteriori suitability for factor formation theory. In order to achieve this, we need run an exploratory factor analysis on the entire sample and use the Kaiser-Meyer-Olkin (KMO) test to determine whether the sample is suitable for factor construction. But since we had already performed this in our own principal component analysis in the research report, it was not required. Consequently, all we needed to do was use the report's KMO value of 0.872, which is consistent with statistical expectations. After that, we treated the dimensions as factors and the questions that measured them as variables in a confirmatory factor analysis. In **Table 3**, its fit statistics are displayed. This led to the conclusion that the model's fit was sufficient.

Table 3. Fit statistics of confirmatory factor analysis.

χ^2		**df**		***p***	
18304		**164**		**< 0. 001**	
Fit Measures				**RMSEA 90% CI**	
CFI	**TLI**	**SRMR**	**RMSEA**	**Lower**	**Upper**
0.705	0.658	0.0795	0.0833	0.0823	0.0843

Therefore, the studies have statistically validated the questionnaire's usefulness, removing any methodological barriers to internationalization.

4.2. Key conclusions of the research in Hungary

In terms of similar patterns across different age groups, we observed several notable consistencies. For example, the tendency toward financial impulsivity and living in the moment was evident across all three groups—children, secondary

school students, and adults. In particular, the 'reactive' financial behavior identified in adults, characterized by delayed responses to financial issues, parallels the 'reckless spending' behavior seen in both children and secondary school students. Additionally, the focus on proactive financial planning and conscious saving behavior, though limited across all groups, was consistently more pronounced in older participants. These observations highlight the potential of early financial education to instill lasting habits, though certain personality traits appear to persist throughout life stages.

The previously mentioned pre-defined personality types were developed during the questionnaire's creation process. But by principal component analysis, a statistical study of the data gathered, we were able to identify a novel personality structure in each of the three age groups. Adults' financial personalities can be categorized along eight categories, the most important being reactivity and attitudes towards order and family. Reactivity is linked to thrift and diligence, yet this personality feature implies that these adults only take action after the issue has arisen. Therefore, they are either unmotivated to stop the issue from getting worse or they do not plan ahead. Similar behavioural patterns are also present in the living-in-the-moment mindset as well as the passive, diligent, and indifferent personality traits. Fifty-three percent of the adult sample is comprised of these three groups. Given this high percentage, cultivating a proactive mindset and the drive to behave appropriately is one of the main goals of adult financial education in Hungary. Adults often struggle with excessive and careless spending. Financial fragility is linked to unconscious saving. Thirty-two percent of individuals fall into this category and they too require more care. Since these two categories together make up 87% of the adult population, nearly all adults (nine out of ten) require financial literacy improvement (**Figure 2**).

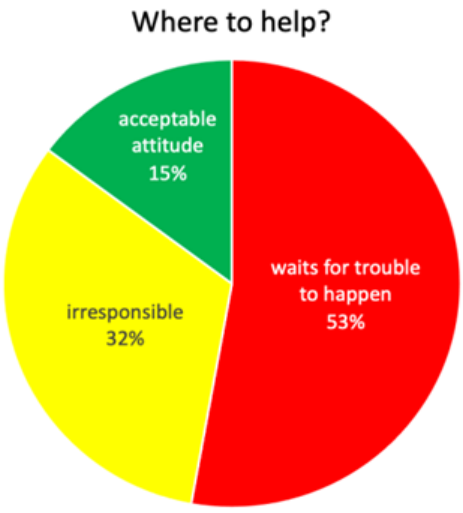

Figure 2. Key areas for adult financial education.

Compared to the adult sample (n = 4471), the sample of secondary school kids has a much smaller number of items. This is as a result of the questionnaire's 2021 debut date. Still, we were able to get some useful results. Seven dimensions make up the personality that was created based on the replies from students in the secondary

school age range. Attitudes towards living in the moment are categorized into distinct dimensions, much like in the case of adults. Independence and creative goals are valued highly and considered an independent personality trait, as is common for this age group. Nearly two-thirds of respondents who are in secondary school (58% who are independent, 16% who are inventive, and 74% overall) exhibit these two characteristics. It's interesting to note that a sizeable percentage (20%) of respondents in this age range are actually quite conservative and lack any inventive tendencies at all. Examining the responses in more detail reveals that the autonomous group is highly diverse (**Figure 3**).

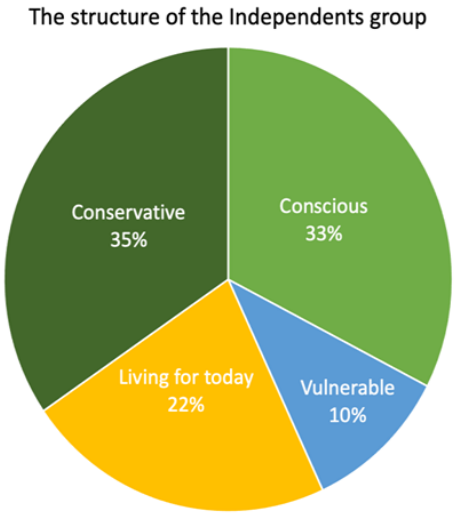

Figure 3. Groups of secondary school students who value autonomy as important.

It is evident that a considerable percentage of secondary school pupils, who value autonomy, also link the desire for autonomy to recklessness and financial instability (almost 30%). It is riskier to have autonomy without awareness than it is to have none at all.

Compared to adults or secondary school pupils, children's answers have a simpler empirical personality structure (see **Figure 4**). There are just four dimensions to it. It is noteworthy, therefore, that two of the four personality qualities are detrimental. They exhibit the same reckless, oblivious spending and living in the moment that we have previously noted in adults and secondary school students. 38% of children exhibit these two behaviours more frequently than the other 62%, who are characterized by a trait that is primarily conscious. However, conscious children can be split into two groups: Forty percent of them show consciousness-related uncertainty, which means that they either lack the courage to decide and behave appropriately, or they act assertively without cause and don't care about the consequences of doing so.

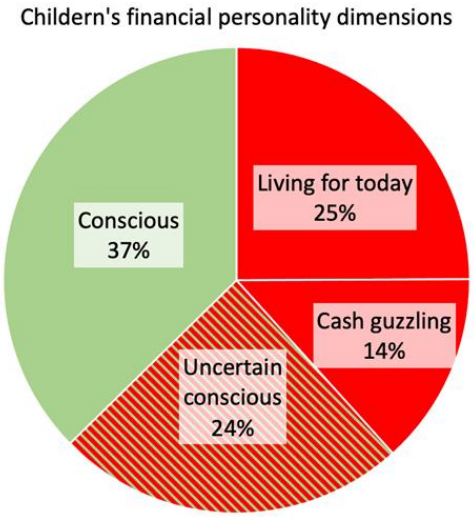

Figure 4. Children's financial personality.

5. Conclusion

We can conclude that specific personality traits are present in Hungarians of all ages based on the empirical picture of financial personality across three age groups. Sadly, not all of these are advantageous. Children, adolescents, and adults who are financially fragile, live in the moment, and make careless spending decisions are also included in this category. They make up 38% of the youngest people, 19% of students in secondary education, and 32% of adults. Age-specific factors can explain the high prevalence among children. Years in public education demonstrate a notable improvement: The proportion of children who lack responsibility has decreased by half. The recurring growth in adulthood raises the possibility that the financial literacy and skills learned in elementary and secondary school are insufficient or not deeply ingrained. This highlights how crucial it is to effectively teach financial behaviour and understanding. It also implies that there is a considerable negative influence from the social environment (such as family dynamics) in addition to learned knowledge.

The methods and findings of a multi-age research project that has been going on in Hungary for approximately ten years were described in our paper. The purpose of this research is to develop a financial personality profile and to provide a standard starting point for future worldwide comparison investigations. The surveys are now being translated into English, but with the assistance of foreign partners who are interested, we hope to soon have versions in Swedish, Italian, Czech, Ukrainian, and Macedonian.

There are, however, several limitations to this study that should be acknowledged. First, the sample is based on voluntary and anonymous survey responses, meaning we could not control for potential biases related to demographic factors such as gender, education level, or residence. This may affect the generalizability of our findings. Second, the study focuses on a specific geographic region, so cultural differences may influence how well these results can be transferred to other countries. Lastly, although the statistical methods used to

validate the questionnaires are robust, there is always a risk that some aspects of financial personality may not be fully captured by the proposed dimensions.

With these limitations in mind, we hope that future research can build on our methodology and extend it to other cultural and geographic contexts, allowing for a broader understanding of financial behavior across different groups and regions.

Author contributions: Conceptualization, BGK and ZZ; methodology, EN; software, EN; validation, BGK, ZZ and EN; formal analysis, EN; investigation, EN; resources, EN; data curation, EN, IPR and SM; writing—original draft preparation, ZZ; writing—review and editing, BGK; visualization, BGK; supervision, ZZ; project administration, ZZ; funding acquisition, ZZ. All authors have read and agreed to the published version of the manuscript.

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References

Bonett, D. G., Wright, T. A. (2015). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning: CRONBACH'S ALPHA RELIABILITY. Journal of Organizational Behavior, 36(1), 3–15. https://doi.org/10.1002/job.1960

Cansiz, S. (2021). Where and How to Use PCA. Understanding how PCA works. Medium. https://medium.com/mlearning-ai/pca-where-to-use-and-how-to-use-b207a1d8e206

Chen, H., Volpe, R. P. (1998). An Analysis of Personal Financial Literacy Among College Students. Financial Services Review, 7(2), 107–128. https://doi.org/10.1016/s1057-0810(99)80006-7

Danes, S. M., Hira, T. K. (1987). money management knowledge of college students.

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S. (2022). The Global Findex Database 2021 (p. 184) [Text/HTML]. International Bank for Reconstruction and Development / The World Bank. https://www.worldbank.org/en/publication/globalfindex

Demirgüc-Kunt, A., Klapper, L., Singer, D., et al. (2018). Global Findex Database 2017: Measuring Financial Inclusion around the World (p. 151). International Bank for Reconstruction and Development/The World Bank. https://doi.org/10.1596/978-1-4648-1259-0

Demirgüc-Kunt, A., Klapper, L., Singer, D., Oudheusden, P. V. (2015). 2014 Global Findex Database: Measuring Financial Inclusion around the World (p. 91). https://doi.org/10.1007/BF01206525

Journal of student financial aid, 17(1), 4-16.

Kálmán, B. G., & Szőke, B. (2024). Financial behaviour of tertiary students and influencing factors. International Journal of Management in Education, 18(5), 409-425.

Klapper, L., Lusardi, A., van Oudheusden, P. (2018). Financial Literacy Around the World: (No. 3313; p. 28). World Bank. https://gflec.org/wp-content/uploads/2015/11/3313-Finlit_Report_FINAL-5.11.16.pdf?x66755

Lusardi, A., Mitchell, O. S. (2014) The Economic Importance of Financial Literacy: Theory and Evidence. Journal of Economic Literature, 52(1), 5–44., 52(1), 5–44. https://doi.org/10.3386/w18952

Németh E., Béres D., Huzdik K., et al. (2013). Felmérés a felsőoktatás studying youth financial kultúrájáról [Survey on the financial culture in higher education, in Hungarian] (ISBN: 978-615-5222-06-1; p. 73). State Audit Office of Hungary.

Petrovics P. (2014). Faktoranalízis az SPSS-ben [Power Point presentation]. Miskolci Egyetem Gazdaságtudományi Kar - előadás, Miskolc. https://nemzetkozi-gazdalkodas.hu/files/952/9_MM_faktor.pdf

Polya, G. (1920). On the central limit theorem of the calculus of probabilities and the problem of moments. Mathematical Journal, 8(3–4), 171–181.

Sipos, L., Tóth, A. (2006). A közgazdasági értelemben irracionálisnak tekintett döntések kognitív okai [Cognitive reasons for decisions considered irrational in the economic sense, in Hungarian] Marketing & Menedzsment, 40(1), 22–30 https://journals.lib.pte.hu/index.php/mm/article/view/774.

Szőke, B., Gábor, Á, Gácsi, R, & Zéman, Z. (2016). Megatrendek scorecard hatása a controllerekre. Gyöngyös, XV. Nemzetközi Tudományos Napok, 1463-1469.

Szőke, B., & Garamvölgyi, J. (2020). A humán erőforrás gazdálkodás és a stratégiába foglalt tudásmegosztás kapcsolata. Humán Innovációs Szemle, 11(2), 30-39.

T. Kárász, J., Nagybányai Nagy, O., Széll, K., Takács, S. (2022). Cronbach's alpha: With or without it? Hungarian Psychological Review, 77(1), 81–98. https://doi.org/10.1556/0016.2022.00004