



Research Article/Özgün Araştırma

Attitude scale towards the use of cryptocurrency among nursing students: A Turkish validity and reliability study

Hemşirelik öğrencilerinde kripto para kullanımına yönelik tutum ölçeği: Türkçe geçerlik ve güvenilirlik çalışması

Yasin ÇETİN¹, Mümin SAVAŞ²

¹Adıyaman University, Faculty of Health Sciences, Department of Nursing, Department of Nursing Management, 02040, Adıyaman-Türkiye

²Adıyaman University, Faculty of Health Sciences, Department of Nursing, Department of Public Health Nursing 02040, Adıyaman-Türkiye

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Abstract

Aim: This research was conducted to realize the validity and reliability of the Turkish version of the attitude scale towards the use of cryptocurrency in nursing students.

Materials and Methods: This research is a methodological research. Language validity, content validity, construct validity, factor and reliability analyzes were performed for the validity and reliability of the scale.

Results: After language validity using the translation-back translation technique, content validity was performed and the content validity index score was determined as 0.80. In confirmatory factor analysis, the Cronbach's alpha coefficient for the whole scale was found to be 0.853, 0.893 for the first sub-dimension, and 0.864 for the second sub-dimension.

Conclusion: As a result of the research, it was determined that the scale was similar to the original scale and the Turkish version of the scale was a valid and reliable measurement tool in evaluating nursing students' attitudes towards the use of cryptocurrencies.

Keywords: Nursing student, Cryptocurrency, Validity, Reliability.

Öz

Amaç: Bu araştırma, hemşirelik öğrencilerinde Kripto Para Kullanımına Yönelik Tutum Ölçeği'nin Türkçe formunun geçerlik ve güvenilirliğini gerçekleştirmek amacıyla yapılmıştır.

Gereç ve Yöntem: Bu araştırma metodolojik bir araştırmadır. Ölçeğin, geçerlik ve güvenilirliği için dil geçerliği, kapsam geçerliği, yapı geçerliği, faktör ve güvenilirlik analizleri yapılmıştır.

Bulgular: Çeviri-geri çeviri tekniği kullanılarak yapılan dil geçerliğinin ardından kapsam geçerliği yapıldı ve kapsam geçerlik indeksi puanı 0,80 olarak belirlendi. Doğrulayıcı faktör analizlerinde ölçeğin tamamına yönelik Cronbach alfa katsayısının 0,853, birinci alt boyutu için 0,893, ikinci alt boyutu için 0,864 olduğu bulundu.

Sonuçlar: Araştırma sonucunda, ölçeğin orijinal ölçekle benzer yapıda olduğu ve ölçeğin Türkçe formunun hemşirelik öğrencilerinin kripto para kullanımına yönelik tutumlarını değerlendirmede geçerli ve güvenilir bir ölçüm aracı olduğu belirlendi.

Anahtar Kelimeler: Hemşirelik öğrencisi, Kripto para, Geçerlik, Güvenirlik.

Yazışma Adresi/Address for Correspondence: Mümin SAVAŞ, Adıyaman University, Faculty of Health Sciences, Department of Nursing, Department of Public Health Nursing 02040, Adıyaman-Türkiye, E-mail: savasmumin@gmail.com

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Introduction

Cryptocurrencies are system-specific digital assets that have a wide variety of purposes in the economic coordination mechanisms of blockchain systems.¹ Blockchain, the technology underlying most cryptocurrencies, is a technical infrastructure centered around a distributed database that is jointly managed, maintained and secured by network participants.^{2,3} The increasing prevalence of cryptocurrency and blockchain technology has a growing interest in many segments of society, from economics to politics.

Due to this increasing interest, it has been reported that cryptocurrency users tend to gamble, and it has been stated that these people tend to have lower self-esteem, a history of hyperactivity and impulsivity, and have higher alcohol use rates than their peers.⁴ It has also been reported that cryptocurrency users are mostly young, male, better educated and wealthier than their peers, and have knowledge and confidence about cryptocurrency.³ In addition, it has been reported that there are always scenarios for cryptocurrencies in the minds of crypto money users.³ Griffiths classified cryptocurrency trading addiction as a subtype of online day trading addiction.⁵ According to Nower the hope of gaining high profits has brought to the agenda that it is similar to a kind of gambling addiction.⁶ In a study conducted by the UK Financial Executive Authority (FCA) on cryptocurrency users, the majority of respondents stated that buying cryptocurrencies is a type of gambling, designed for those who diversify their portfolio or expect quick earnings.⁷ Similarly, it has been reported that cryptocurrency trading increases commitment to gambling.³ In a different study on those who follow cryptocurrency trading, it was conducted to determine how sudden fluctuations in the exchange rate cause a change in mood on users. The participants stated that they suffer from sudden drops and fluctuations, make them unhappy, have difficulty sleeping at night, have a constant sense of anxiety, and negatively affect their work performance.⁷ It has been emphasized that large fluctuations in the crypto money market can have negative

effects on the mental health of users such as anxiety, distress and demoralization.^{3,7} It has been reported that many negative processes such as constant arguments about debts, neglect of family members, violence and divorce are more common in the family life of crypto currency users.^{8,9}

Nursing encompasses holistic care practices that potentially improve the health and well-being of patients. Nursing offers opportunities beyond the more traditional health approaches typically emphasized in basic and graduate nursing education programs and encouraged in acute care settings. Nurses are instilled in the holistic value of the individual "physically, mentally and spiritually" and practices that include this value in the "art and science" of nursing.¹⁰ It includes management and decision-making processes rather than individualized care practices that include physical, nutritional, emotional, social, spiritual, intellectual and even financial well-being in addition to a situation where patient care settings often give priority to physical well-being, technology-oriented care.¹¹ In this context, it is very important to determine the habits of nursing students, who climb the intensive education and training steps to step into the nursing profession, which includes all processes of care, which takes care of the patient in every sense, and which can harm themselves, their families and, of course, their patients before they start the profession is important. Although it is not a payment instrument according to the current legal system in Turkey, Turkey ranks 4th in the world and 1st in Europe in cryptocurrency investment with 16%.^{12,13} It also ranks 6th among the countries that make the most profit from cryptocurrencies.¹⁴ Therefore, the interest in cryptocurrencies, which are described as electronic money, attracts great interest from the population in Turkey.¹⁵ While the state approaches cryptocurrencies with a distance, citizens show great interest in cryptocurrencies.^{16,17}

By determining the attitudes of nursing students towards crypto money trading, which is a new trend today, they will not experience problems such as stress, anxiety, worry, suicidal thoughts, thoughts of divorce, family

violence, loss of work and performance, sleep disorders, rhythm disorders that they may encounter in the future both in their family life and in their professional lives. In this study, it is aimed to make the validity and reliability of the scale developed by Gagarina et al.¹⁸

Materials and Methods

The study form prepared by the World Health Organization for scale development was translated and adapted for this study.¹⁹ The Attitude Scale Towards Cryptocurrencies was translated from English to Turkish by two linguists who are academically fluent in both Turkish and English. In order to determine the inadequacies and inconsistencies in the expressions in the translation, the translations of the scale were translated from Turkish to English by 5 PhD graduates who are fluent in both English and Turkish languages. Afterwards, it will be rejected by the first author to ensure that the translation is conceptually and linguistically appropriate for item-by-item comparisons. The suitability of the scale adaptation between the original text and the English text was investigated. Experts examined the scope validity of the Crypto money scale and suggested some changes in the Turkish version of the Crypto money scale. All of the changes to the cryptocurrency scale were made under expert review.

Research design

In this study, a methodological research design was preferred to test the Turkish version of the Attitudes Towards Cryptocurrencies Scale.

Sample of the research

The population of the study consisted of Nursing students of Adiyaman University Faculty of Health Sciences in Adiyaman. There are 500 nursing students in total in the institution. The number of participants was determined as at least ten times the number of items in the scale used. The data collection phase of the research was carried out between 20.11.2022 and 20.12.2022.

Data collection tools

In this study, as a data collection tool; "Introductory Information Form", "Attitude

Scale Towards Cryptocurrencies" developed by Gagarina et al. was applied.¹²

Information Form, It includes questions about gender, age, monthly income of their families, whether they work in a job, the type of residence their families live in, their knowledge of cryptocurrencies, whether they have bought or are considering buying crypto money.

Attitude Scale Towards Cryptocurrencies (ASTC), Gagarina et al. as 10 items and a triple likert scale. The lowest score that can be obtained from the scale is 10 and the highest score is 50. As the score obtained from the scale increases, the concerns of individuals about crypto money increase. The original Cronbach alpha coefficient of the Attitudes Towards Cryptocurrencies Scale was $\alpha=0.90$.¹²

Data Collecting, the research was applied to nursing students who accepted to participate in the study. Written and verbal consent was obtained from the students before starting the study. Before starting the research, a pilot study was conducted with 10 students to determine the clarity of the questions. Based on this, 163 students were reached in this study. According to the COSMIN guide,²⁰ it is stated that between 50 and 99 participants are sufficient for retesting. Therefore, for test-retest purposes, the test was re-administered two weeks later to 58 individuals in the group to which the scale was applied.

Criteria for inclusion in the research students;

- Studying in the department of nursing,
- Complete research questions,
- Participating in the research voluntarily.

Data analysis

SPSS 16.0 and LISREL 8.7 programs were used for the validity and reliability analyzes required during the development of the scale. In order to determine the construct validity of the scale, KMO and Bartlett test analyzes were performed, and it was decided whether factor analysis would be performed within the scope of the value found. In the light of the data obtained, exploratory factor analysis and confirmatory factor analysis were performed.

In order to determine the reliability of the scale, internal consistency coefficients will be examined and Cronbach's Alpha reliability coefficient was calculated to determine the level of internal consistency.

Ethics committee approval

Permission was obtained from Adıyaman University Social and Human Sciences Ethics Committee (No: 28.10.2022-336) and Adıyaman University Faculty of Health

Sciences Department of Nursing to collect data in the study.

Results

The students participating in the research, 112 (68.7%) were female and 51 (31.3%) were male. The ages of the participants ranged between 18 and 33, with a mean age of 19.88 ± 1.92 . Demographic data are given in Table 1.

Table 1. Demographic characteristics of the participants (n = 163).

Demographic characteristics	n	(%)
Age		19.88±1.92
Gender	Female	112
	Male	51
Your family's monthly income	0-5000	99
	6000-10000	39
	11000-15000	19
	16000-20000	4
	210000-Over	2
Do you work in any job other than your education?	Yes	8
	No	155
Where your family lives	Province	93
	Town	50
	Village	20
Do you know about crypto money?	Yes	52
	No	111
Are you considering buying cryptocurrencies?	Yes	22
	No	141

Validity test

Internal validity

It was sent to five experts who were informed about the concepts of the ASTC and the purpose of the scale. Experts were asked to rate the necessity of each item of the ASTC on a five-point Likert scale. As a result of the evaluations of the experts, the content validity index (CVI) of the scale was calculated as 0.80. The fact that the CVI value for this study is above the acceptable (0.70) value indicates that the ASTC has acceptable content validity.

Construct validity

In the factor analysis of the research, varimax was used as principal component extraction. Barlett test score of ASTC was 944.771 ($p < 0.001$) and KMO value was 0.849, which is in the appropriate range for the global test. After this stage, exploratory factor analysis (EFA) was performed. As a result of the analysis, two values with the screeplot

eigenvalues greater than 1.0 were found. The sub-dimension of Beliefs in the potential of cryptocurrency as a payment instrument and willingness to use cryptocurrencies consists of 7 items (items 1-7) and its eigenvalue was found to be 4.613, explaining 46.128% of the variance. Worries about the introduction of cryptocurrency, its sub-dimension consists of 3 items (items 8-10), explains 22.160 of the variance and its eigenvalue is calculated as 2.216.

The factor load of all the items of the ASTC is higher than 0.30 (Table 2). After the factor structure was obtained by EFA, analysis was performed with a different sample with LISRELL 8.7 and confirmatory factor analysis (CFA). The model obtained after the modification indices were made for the model mismatch in the research is shown in Figure 1. ASTC has 10 items and two factors and acceptable fit values as a result of CFA (χ^2 (N = 163) = 72.60, $p < 0.001$; $\chi^2/df = 2.268$). The

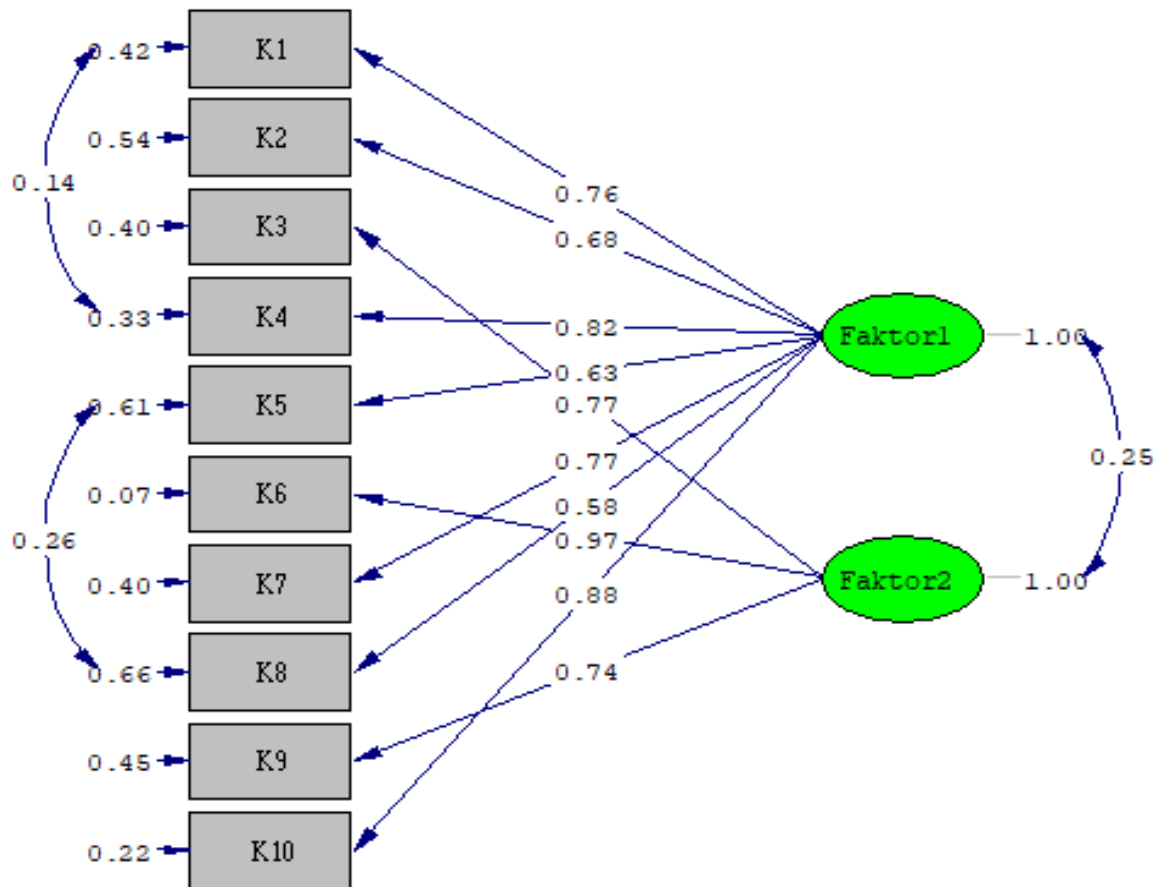
acceptable fit values of the two-factor structure of the scale valid for nursing students are

shown in Table 3. Also, the correlation between the scale items is given in Table 4.

Table 2. Construct validity of the ATCQ: individual item loadings from the exploratory factor analysis (n = 163)

Items	Factor 1	Factor 2	Total item correlation
10. I discuss cryptocurrency news with my friends and acquaintances	0.875		0.576
4. I caught myself thinking about cryptocurrency mining	0.850		0.577
7. After 5 years, most of the stores in which I shop will accept payments in bitcoins	0.839		0.643
1. I follow the news about the value of bitcoin and the development of cryptocurrencies	0.809		0.673
2. The development of cryptocurrency is as inevitable as scientific and technical progress	0.730		0.576
5. In 10 years, cryptocurrencies will be issued by the state and will replace the money	0.679		0.626
8. After 5 years, most of the stores in which I shop will accept payments in bitcoins	0.636		0.656
6. I worry that cryptocurrency opens up unlimited possibilities for financial fraud		0.900	0.452
9. I am concerned about the fact that cryptocurrencies are not provided with anything, except for the greed of people		0.872	0.518
3. I am worried that bitcoin and other cryptocurrencies are most profitable for criminals and terrorists, as they allow money laundering and tax evasion		0.851	0.375
Eigenvalue	4.613	2.216	
Percent total variance	46.128	22.160	

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 5 iterations



Chi-Square=72.60, df=32, P-value=0.00005, RMSEA=0.088

Figure 1. The final structural model of ATCQ among nursing studies (n = 138)

Table 3. Fit indices of five-component structure model of the ATCQ

Fit Index	Value
Comparative fit index (CFI)	0.97
Normed Fit Index (NFI)	0.95
Non- Normed Fit Index (NNFI)	0.96
Incremental Fit Index (IFI)	0.97
Goodness of Fit Index (GFI)	0.92
Adjusted Goodness of Fit Index (AGFI)	0.86
Root mean square error approximation (RMSEA)	0.088

Table 4. Concurrent validity coefficients of the ATCQ.

Scale	1	2	3	4	5	6	7	8	9	10
1	-	0.482**	0.152**	0.761**	0.460	0.175	0.550	0.339	0.014	0.718
2		-	0.205**	0.544**	0.476	0.200	0.571	0.448	0.097	0.576
3			-	0.160*	0.298**	0.744**	0.055	0.270**	0.580	0.142
4				-	0.477**	0.207**	0.605**	0.429**	0.077	0.758**
5					-	0.348**	0.565**	0.621**	0.281**	0.507**
6						-	0.093	0.278**	0.714**	0.197**
7							-	0.582**	0.005	0.665**
8								-	0.313**	0.480**
9									-	0.048
10										-

Note: All coefficients are significant at $p < 0.01$

Reliability Analysis

Cronbach alpha values were examined to determine the internal consistency of the ASTC, and as a result of the analyzes performed, it was determined that the Cronbach alpha values were in the acceptable range. Cronbach's alpha value was 0.853 for the whole ASTC, and the Cronbach's alpha coefficient of the sub-dimensions was

calculated as 0.893 for the first sub-dimension and 0.864 for the second sub-dimension (Table 5). It is seen that ASTC has acceptable internal consistency with these values. In order to determine the test-retest reliability of ASTC, it was applied to 58 students two weeks later. The test-retest reliability of ASTC was calculated as 0.826, and the scale is reliable according to this value.

Table 5. Internal consistency of the ATCQ (Cronbach's a coefficient, n = 163).

Subscales (no. of items)	Composite scores	Cronbach's a coefficient
Factor 1 (7)	13.37±6.51	0.893
Factor 2 (3)	8.99±3.83	0.864

Discussion

Around 300 million people worldwide use cryptocurrencies, which is a socially significant ratio.²¹ Turkey has twice the average of Europe and the USA (16-25%) cryptocurrencies.²²⁻²⁴ In particular, high inflation in the Turkish lira has led to an alternative option for individuals in Turkey to maintain their purchasing power and make their payments, even though cryptocurrencies are volatile.^{25,26} This has made Turkey a top priority for studying cryptocurrency holders and their motivations. All items of the scale were validated with the results obtained in this research, which was planned to determine the anxiety status of cryptocurrency holders. According to the results from the scale, the desire to use cryptocurrencies, concerns about

cryptocurrencies, and beliefs about cryptocurrencies are an inevitable consequence of young students' views on cryptocurrencies due to scientific and technological advances. It is seen that individuals willing to use crypto money do it for investment purposes. Participants see cryptocurrencies as promising for their future.

The ASTC was developed to determine the attitudes of young people towards cryptocurrency, which has gained significant popularity recently. ASTC was developed in Russia and its Turkish validity and reliability has not been established before.¹⁸ ASTC was translated into Turkish in our research. According to the literature review, this research is the first to confirm the ASTC in Turkish in a sample of nursing students.

EFA was used to determine the factors of ASTC and a two-factor structure was obtained. EFA explains 46.128% of the variance in the first stage. In our study, the Cronbach alpha coefficient for the whole scale was 0.853, for the Beliefs in the potential of cryptocurrency as a payment instrument and willingness to use cryptocurrencies factor, it was 0.893 and the Cronbach alpha coefficient of the Worries about the introduction of cryptocurrency factor was calculated as 0.864. These results show similar results with the Cronbach alpha coefficients of the original three-dimensional scale (0.827, 0.884, 0.900, respectively).¹⁸

ASTC is a valid and reliable tool for Turkish with 10 items and 2 sub-dimensions. ASTC has high reliability with a Cronbach alpha value of 0.853.

Conclusion

As a result of the validity and reliability analyzes, it was concluded that the Attitude Scale Towards Cryptocurrencies Questionnaire is a valid and reliable measurement tool in evaluating the attitudes of nursing students in Turkish society towards the use of cryptocurrencies. Attitude scale towards the use of cryptocurrency consist of Belief in the potential of cryptocurrency as a payment instrument (Factor 1) and Willingness to use cryptocurrency (Factor 2) subscales. Belief in the potential of cryptocurrency as a payment instrument consist of 1, 2, 4, 5, 7, 8, 10 items. Willingness to use cryptocurrency consist of 3, 6 and 9 items. As a result of the research, it was determined that the content validity, model fit and reliability of this scale were high and it consisted of two sub-dimensions. It is recommended to use the scale with nursing students studying in different institutions, to evaluate the attitudes of nursing students towards the use of cryptocurrencies at regular intervals through this scale, and to compare the results. In addition, it is thought that it will be important to adapt the validity and reliability of different measurement tools examining the attitudes towards the use of crypto money in nursing students and thus to determine the most appropriate measurement tool.

Limitations

The limitation of the study is that the study was conducted in a single center and only for nursing students.

Ethics Committee Approval

Ethical approval was received from the Adıyaman University Social and Human Sciences Ethics Committee (28/10/2022 & 336) for the carrying out of this study. By explaining the purpose and benefits of the study, written and verbal consents of all the participants were obtained.

In addition, this scale, which we have validated and verified, includes questions about whether users follow current information about crypto money, constantly think about crypto money, the direction and applicability of crypto money in the future, whether current systems are open to fraud for crypto money users, whether they are used in tax evasion or money laundering. When we look at the studies conducted on crypto money use in the literature, it has been determined that the scales used in a similar way examine topics such as anxiety-addiction-worry-lifestyle of the users.^{12,27,28}

Informed Consent

The study was explained to the participants and their consent was obtained.

Author Contributions

All authors contributed to the conception and design of the study. M.S., and Y.C. performed data collection. M.S. and Y.C., made substantial contributions to analysis and interpretation of data. M.S. drafted the manuscript. M.S., and Y.C. critically reviewed the manuscript and supervised the whole study process. All authors read and approved the final version of the manuscript.

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Conflict of Interest

The authors have no funding or conflicts of interest to disclose.

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Statements

The results of this study were not published or presented anywhere previously.

Peer-review

Externally peer-reviewed.

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