

Psychometric Properties of Academic Dishonesty Tendency Scale for Graduate Students and Investigating Academic Dishonesty Tendency Levels with CHAID Analysis *

Esra EMİNOĞLU ÖZMERCAN ** Betül POLAT *** Zekeriya NARTGÜN ****

Abstract

The number of unethical academic dishonesty behaviours is increasing with each day in higher education. Thus, it is important to determine the level of the behaviour of academic dishonesty in the education system, the tendencies of students to perform this behaviour, and the individuals who have a tendency to show this behaviour in advance. The research has two different aims. The first one is to determine the psychometric properties of the Academic Dishonesty Tendency Scale (ADTS) originally developed for undergraduate students, not for graduate students. The second aim is to investigate the variables that best explain the academic dishonesty tendency levels of the students who continue their graduate education by using the CHAID analysis method. As a result of the analyses, it was determined that the Academic Dishonesty Tendency Scale is also a valid and reliable measurement tool for graduate students. The only significant variable explaining the students' Tendency Towards Cheating was found to be the level of graduate education. It was also determined that the most important variable affecting the “dishonesty tendency at studies as homework, project, etc.–common” is the level of graduate education. The only significant variable explaining the “dishonesty tendency at research and process of write up” was found to be the reason for receiving graduate education. The most significant variable explaining the “dishonesty tendency towards reference” of the students was found to be the level of graduate education. It was determined that the most significant variable explaining the Academic Dishonesty Tendency of the students is the level of graduate education.

Key Words: Academic dishonesty, CHAID analysis, graduate education.

Introduction

Unethical academic dishonesty behaviours such as cheating and plagiarism in higher education have become an important problem. Baran and Jonason (2020) state that this problem causes undesirable situations for both the education system and students, while Blachnio et al. (2021) state that it has serious consequences in terms of human life, social values, and the economy. Despite its negative consequences, academic dishonesty is widely observed among higher education students and often leads students to dishonest practices in their daily lives (Baran & Jonason, 2020). This is a worrying situation for university students, faculty members, and administrators as it can have adverse effects on higher education (Whitley & Keith-Spiegel, 2002).

Academic dishonesty is defined as students' showing the academic study of others as if it was their own and includes behaviours such as cheating in exams, changing exam papers, copying other students' homework, making changes in homework, or plagiarism (Aluede et al., 2006; Jensen et al., 2002). According to Pavela (1978), academic dishonesty consists of four components (cheating, fabrication, plagiarism and facilitating academic dishonesty). The first of these is cheating, which is

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** Instructor Dr., Istanbul University, Faculty of Open and Distance Education, Istanbul-Turkey, esemcan@gmail.com, ORCID ID: [0000-0003-4105-9837](https://orcid.org/0000-0003-4105-9837)

*** Assist. Prof. Dr., Niğde Ömer Halisdemir University, Faculty of Education, Niğde-Turkey, betul.polat6006@gmail.com, ORCID ID: [0000-0002-1618-3118](https://orcid.org/0000-0002-1618-3118)

**** Prof. Dr., Bolu Abant İzzet Baysal University, Faculty of Education, Bolu-Turkey, nartgun@yahoo.com, ORCID ID: [0000-0003-4006-372X](https://orcid.org/0000-0003-4006-372X)

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the intentional use or attempt to use unauthorized materials, information or supplementary resources in any academic study, the second is fabrication, referring to the deliberate and unauthorized falsification or invention of any information or quotation in any academic study, the third is plagiarism referring to deliberate use or imitation of another person's words, statements or ideas without any approval as if they were one's own and the fourth one is facilitating academic dishonesty, which is knowingly or willingly helping or trying to help another person and engaging in a kind of academic dishonesty. Whitley and Keith-Spiegel (2002) added the component of sabotage which consists of misrepresentation (misinforming a lecturer about an academic exercise), failure to contribute to a collaborative project, and actions that prevent others from completing their work to the components of Pavela (1978).

One of the academic dishonesty behaviours, the concept of cheating, is defined as "the falsification of a performance of art or a written text", "secretly making use of another person or place to answer questions in an exam" and "prepared paper to peek at in written exams" in the Turkish Language Institution (Türk Dil Kurumu [TDK]). Current Turkish Dictionary (TDK, 2021) while the act of cheating is defined as "secretly peeking at a source in order to answer questions in written exams", plagiarism is defined as "taking parts or lines from others' written products and then showing them as if one's own or presenting others' ideas as if one's own."

Like cheating, plagiarism is also considered within the scope of academic dishonesty. In the second part of the Higher Education Institutions Scientific Research and Publication Ethics Directive, plagiarism, fabrication, distortion, duplicate submission, salami publication, and unfair authorship are defined as violations of the scientific research and publication ethics. From these unethical behaviours,

- (a) Plagiarism is defined as presenting the original ideas, methods, data or works of others as one's own in whole or in part without referencing in accordance with scientific rules,
- (b) Fabrication is defined as the use of non-existent or alternated data in scientific research,
- (c) Distortion is defined as intentionally distorting the research findings or the obtained data, showing equipment or materials that are not used in the research as if they were used and distorting or changing the data in such a way as to be in favour of the funding individuals or organizations,
- (ç) Duplicate submission is defined as publishing more or less the same study in more than one journal and using them for academic appointment and promotion,
- (d) Salami publication is defined as the publication of two or more articles on the basis of a single study by dividing it into parts in such a way as to distort its unity and presenting them as separate publications for academic appointment and promotion,
- (e) Unfair authorship is defined as including individuals who do not have an active contribution among the authors or not to including those who do, changing the order of authors unjustifiably and improperly, to remove the names of those who contributed actively from the work in subsequent editions, making one's name included among the authors by using their influence without having any active contribution. (Yükseköğretim Kurulu [YÖK], 2016).

Other types of ethical violations are as follows:

- (a) Not specifying the funding persons, organizations or institutions and their contributions in the publications made as a result of research carried out with their support,
- (b) Using the studies or thesis that have not yet been presented or defended as a reference without the permission of the author,
- (c) Failure to comply with ethical rules in research on animals and humans, and not respecting patient rights in publications,
- (ç) Violating the provisions of the relevant legislation in human biomedical research and other clinical research,
- (d) Sharing the information contained in a work assigned to review with others before it is published without the express permission of the author,
- (e) Misuse of resources, places, facilities and devices provided or allocated for scientific research,
- (f) Alleging unfounded and deliberate ethical violations,
- (g) Publishing the data obtained without the explicit consent of the participants in surveys and attitude studies conducted within the scope of a scientific study or, if the research has been conducted in an institution, without the permission of the institution,
- (h) Doing harms to animal health and ecological balance in research and experiments,
- (i) Failure to obtain written

permissions from authorized units before starting studies in research and experiments, (j) Carrying out studies in research and experiments contrary to the provisions of the legislation or international conventions to which Turkey is a party, (k) Failure to comply with the obligation of researchers and authorities to inform and warn those concerned about possible harmful practices related to a scientific research, (l) Not using the data and information obtained from other persons and institutions in scientific studies to the extent and in the manner permitted, not complying with the confidentiality of this information and not ensuring its protection, (m) Making false or misleading statements regarding scientific research and publications in academic appointments and promotions. (YÖK, 2016)

The higher education institutions' goal should be not only to provide education for the accomplishment of learning outcomes, to carry out activities for individuals, to adopt desired behaviours, to train well-qualified graduates in the professional sense but also to create individuals who are well-trained in the moral and professional sense, who abide by ethical rules and who are fair, responsible and versatile. For this reason, it is thought that it is necessary for the education system to determine the academic dishonesty tendency levels of students in higher education institutions and the variables affecting these levels, to learn the reasons for academic dishonesty according to the results obtained, to take precautions against them and to make suggestions.

There are many studies on the extent of academic dishonesty at secondary and undergraduate levels and the tendencies of students at these levels towards academic dishonesty (Alkan, 2008; Aydın & Güllü, 2021; Gümüşgöl et al., 2013; Hançer, 2017; Köse & Öztumur, 2013; Taşgın et al., 2019; Tayfun et al., 2020). In graduate education, where scientific studies are carried out more intensively (master or doctoral thesis, manuscripts, homework, etc.), it is of great importance that students comply with and attend to scientific, ethical principles during and after the education process. However, no study has been found in the related literature on measuring the tendencies of graduate students towards this behaviour and determining the variables that explain the tendency levels. For this reason, due to the importance of applying ethical principles in education and the lack of sufficient research on this subject, it seemed to be necessary to determine the academic dishonesty tendency levels of graduate students and the variables that explain their tendency levels.

Purpose of the Study

This study is thought to contribute to the development of students' awareness of ethics, and it is thought that by determining the variables that explain the academic dishonesty tendency levels, it will be possible to prevent academic dishonesty and to carry out studies related to it. In this context, the current study has two purposes. The first is to determine the psychometric properties of the Academic Dishonesty Tendency Scale (ADTS) originally developed for undergraduate students for graduate students. The second is to investigate the variables that best explain the academic dishonesty tendency levels of the students who continue their graduate education by using the CHAID (Chi-squared Automatic Interaction Detection) analysis method. When the literature is examined (Adıbatmaz & Kurnaz, 2017; Akbaşı et al., 2019; Akdağ & Güneş, 2002; Ayoub/Al-Salim & Aladwan, 2021; Barın et al., 2018; Bateman & Valentine, 2010; Belet-Boyacı et al., 2017; Brown, Bourke-Taylor et al., 2019; Brown, Isbel et al., 2019; Brown, Isbel et al., 2020; Burns, et al., 1998; Chow et al., 2021; Coate & Frey, 2000; Çenberci, 2018; Çetin, 2007; Dağışan et al., 2017; Dam, 2013; Demir & Arcagök, 2013; Duran, 2020; Eminoğlu-Küçüktepe & Küçüktepe, 2012; Eriksson & McGee, 2015; Ersoy & Özden, 2011; Gümüşgöl et al., 2013; Hadjar, 2019; Hensley et al., 2013; Kadı et al., 2016; Kaymakcan, 2002; Keçeci et al., 2011; Kırıl & Saracaloğlu, 2018; Kocaman-Karoğlu & Bakar-Çörez, 2020; Koç, 2018; Korn & Davidovitch, 2016; Lin & Wen, 2007; McCabe & Trevino, 1997; Nonis & Swift, 1998; Novianti, 2022; Ömür et al., 2014; Öztürk-Başpınar & Çakiroğlu, 2019; Özyurt & Eren, 2014; Pearson, 2019; Pino & Smith, 2003; Roig & Caso, 2005; Szabo & Underwood, 2004; Şenel et al., 2020; Taşgın et al., 2019; Tayfun et al., 2020; Tümkaya, 2019; Uçak & Ünal, 2015; Underwood & Szabo, 2003; Ünlü & Eroğlu, 2012; Watson, 2013; Whitley, 1998; Whitley et al., 1999; Yang et al., 2017; Yangın & Kahyaoglu, 2009; Yeşilyaprak & Öztürk, 1996; Yıldırım, 2015) the following variables were decided to be included in this study to analysis. Gender differentiation of cheating

tendencies between female and male students was preferred because the gender variable is frequently used in the literature and different results were obtained (Adıbatmaz & Kurnaz, 2017; Akbaşlı et al., 2019; Akdağ & Güneş, 2002; Ayoub/Al-Salim & Aladwan, 2021; Barın et al., 2018; Bateman & Valentine, 2010; Belet-Boyacı et al., 2017; Burns, et al., 1998; Chow et al., 2021; Coate & Frey, 2000; Çenberci, 2018; Çetin, 2007; Dağışan et al., 2017; Dam, 2013; Demir & Arcagök, 2013; Duran, 2020; Eminoğlu-Küçüktepe & Küçüktepe, 2012; Eriksson & McGee, 2015; Ersoy & Özden, 2011; Gümüştül et al., 2013; Hadjar, 2019; Hensley et al., 2013; Kadı et al., 2016; Kaymakcan, 2002; Keçeci et al., 2011; Kırıl & Saracaloğlu, 2018; Kocaman-Karoğlu & Bakar-Çörez, 2020; Koç, 2018; Lin & Wen, 2007; McCabe & Trevino, 1997; Nonis & Swift, 1998; Novianti, 2022; Ömür et al., 2014; Öztürk-Başpınar & Çakıroğlu, 2019; Özyurt & Eren, 2014; Pearson, 2019; Pino & Smith, 2003; Roig & Caso, 2005; Szabo & Underwood, 2004; Şenel et al., 2020; Taşgın et al., 2019; Tayfun et al., 2020; Tümkaya, 2019; Uçak & Ünal, 2015; Underwood & Szabo, 2003; Ünlü & Eroğlu, 2012; Whitley, 1998; Whitley et al., 1999; Yang et al., 2017; Yangın & Kahyaoğlu, 2009; Yeşilyaprak & Öztürk, 1996). The graduate program attended due to the difference in the level of academic dishonesty according to the duration of graduate education (non-thesis master's, thesis master's, doctorate) was preferred because the studies with graduate students are limited (Kırıl & Saracaloğlu, 2018). The academic achievement variable was preferred because academic dishonesty decreased when academic achievement increased (Tas & Tekkaya, 2010). The reason for receiving graduate education and academic achievement variable was preferred because it is thought they can easily affect the academic dishonesty tendency levels. In this context, the following research problems have been sought:

1. What are the psychometric properties of the ADTS for graduate students?
2. What is the best defining variable of academic dishonesty tendency scores for graduate students?
3. Which variables define the academic dishonesty tendency scores of graduate students respectively?

Method

Since the first aim of the study was to determine the psychometric properties of the ADTS originally developed for undergraduate students not for graduate students, it was conducted based on the descriptive survey model, which is one of the quantitative data collection models. In the descriptive survey model, research is carried out to describe a given phenomenon or situation fully. In addition, the descriptive survey model is used in research to reveal talents, preferences, and attitudes in the field of education (Büyüköztürk et al., 2016). The second aim of the study was to investigate the variables that best explain the academic dishonesty tendency levels of graduate students because of this purpose the relational survey model was used. The relational survey model is a general survey model that aims to determine whether there is a covariance between two or more variables (Karasar, 2012).

Study Group

In this research, two different study groups were used in order to accomplish the two aims of the study. In order to apply the ADTS to graduate students, data were collected from 426 students studying at different institutes (Institute of Educational Sciences, Social Sciences, Natural and Applied Sciences, Health Sciences and Graduate Studies) of nine universities from five different regions (Black Sea, Central Anatolian, Eastern Anatolia, Marmara and Mediterranean) in the 2020-2021 academic year in Turkey. After the outliers were removed, the study was conducted on the data of 326 students. In order to perform CHAID analysis, the data of 336 students studying at the Educational Sciences Institutes of different universities were used. Demographic factors of the study groups are given in Table 1.

Table 1
Demographic Factors of the Graduate Students

Variable		Study Group 1 (n=326)		Study Group 2 (n=336)	
		f	%	f	%
Gender	Female	218	66.9	227	67.6
	Male	108	33.1	109	32.4
Program attended	Non-thesis master's	29	8.9	22	6.5
	Thesis master's	202	62.0	211	62.8
	Doctorate	95	29.1	103	30.7
Stage of the graduate program	Taking courses	206	63.2	208	61.9
	Writing thesis	120	36.8	128	38.1

Data Collection Instruments

In the current study, a Personal Information Form and the ADTS were used as the data collection instruments.

Personal Information Form

The Personal Information Form was prepared by the authors. The form includes items to elicit data about the students' gender, undergraduate grade point average, type of the graduate program attended, stage of the graduate program (course-thesis), the reason for receiving the graduate education, the institute attended, academic achievement, and employment.

Academic Dishonesty Tendency Scale (ADTS)

The Academic Tendency Scale was developed by Eminoğlu (2008) for undergraduate students. The scale is comprised of four subscales and 22 items. There are five items in the subscale of Tendency Towards Cheating, seven items in the subscale of Dishonesty Tendency at Studies as Homework, Project, etc.–common, four items in the subscale of Dishonesty Tendency at Research and Process of Write up and six items in the subscale of Dishonesty Tendency Towards Reference. Cronbach Alpha reliability coefficients of four factors and whole scale is .71; .82; .79; .78 and .90 respectively. The test-retest reliability coefficient is .88. The response options in the scale designed in the form of five-point Likert scale are *completely agree*, *agree*, *indecisive*, *disagree*, and *completely disagree*. When the scores collected from the scale are examined, the academic dishonesty tendency levels are classified as very low level academic dishonesty tendency (range 1.00-1.79), partial academic dishonesty tendency (range 1.80-2.59), medium level of academic dishonesty tendency (range 2.60-3.39), high level academic dishonesty tendency (range 3.40-4.19), and very high level academic dishonesty tendency (range 4.20-5.00).

Data Collection Procedure

The data were collected in this study with the ADTS and Personal Information Form that is prepared by researchers. The measurement tools were transferred to Google forms and sent to the students using e-mail, and other information communication technologies, and the students were asked to respond. Within the scope of the study, all the procedures indicated in the Higher Education Institutions Scientific Research and Publication Ethics Directive were complied with and none of the Actions Contrary to Scientific Research and Publication Ethics were carried out. After receiving the ethics committee approval, the students who voluntarily participated in the research were informed about the purpose and duration of the study, they were provided with the Informed Consent Form to read, and their written consent was obtained. It was stated in the Informed Consent Form that the answers given to the measurement tool would be kept confidential, the names of the participants would not be required, their identities would not be revealed, and none of their personal information would be shared with third parties.

Data Analysis

In order to accomplish the first aim of the study, Confirmatory Factor Analysis (CFA) was used to test the construct validity of the ADTS. CFA is a factor analysis to test the suitability of the factors determined by Exploratory Factor Analysis (EFA) for the factor structures determined by the hypothesis. It is a method used to hypothetically test the hypothesis that there is no significant relationship between factors (latent variables) and variables that play a major role in determining factors (manifest variables). In CFA, using the factors determined by EFA and the variables in the data matrix, it is investigated whether there is a high correlation between the factors and the variables (Özdamar, 2002). LISREL 8.7 program was used for CFA. The RMSEA value was calculated to be smaller than .08, indicating a good fit (Kline, 2011; Tabachnick & Fidell, 2007). The SRMR value between .05 and .10 indicates that the model-data fit is acceptable (Schermelleh-Engel et al., 2003). NNFI and CFI values of .90 and above also indicate that the model-data fit is good (Hu & Bentler, 1999). In order to test the reliability, the Cronbach Alpha internal consistency coefficient was calculated in the SPSS 21 program. According to Hair et al. (2016), a Cronbach Alpha coefficient between .60 and .69 indicates a moderate level of reliability. According to Nunnally (1978), a reliability coefficient of .70 and above is considered acceptable.

In order to accomplish the second aim of the study, CHAID analysis was used to determine the variable(s) that best explain the academic dishonesty level of the students continuing their graduate education (gender, type of graduate education program attended, the reason for taking graduate education and how successful students find themselves academically). CHAID analysis is used to determine the relationships between one predicted variable and more than one predictor variable (Diepen & Franses, 2006; Dođan & Özdamar, 2003). CHAID analysis is a powerful statistical technique because it can analyse data obtained from ratio, interval, and nominal scales simultaneously and show the relationships between the predicted and the predictor variables in detail on a figure that covers the entire possible hierarchy (Üngüren & Dođan, 2010). CHAID analysis was performed using the SPSS 21 program, and the significance level was taken as .05.

CHAID analysis is a method used in studies to determine the relationship between a dependent variable and independent variables (Dođan & Özdamar, 2003). CHAID analysis can divide the universe into stable sub-nodes with a powerful iteration algorithm. Therefore, this process can provide normality and homogeneity in the given distribution (Kayri & Boysan, 2007). The most important difference between CHAID analysis and other decision tree methods is due to tree derivation. While other methods derive binary trees, CHAID analysis generates multiple trees (Üngüren & Dođan, 2010).

Results

The current study has two aims. The first is to determine the psychometric properties of the ADTS originally developed for undergraduate students for graduate students. The second is to investigate the variables that best explain the academic dishonesty tendency levels of the students who continue their graduate education by using the CHAID analysis method.

Findings for First Aim of the Study

Construct Validity

CFA was conducted to figure out whether the four-dimensional structure of the scale was confirmed in the data obtained from 426 graduate students. First, it was tested whether the data set satisfied the assumptions. In order to examine the univariate outliers, standard z values for the responses given to each item were calculated, and it was determined that the z values obtained were in the range of (-3) to (+3). Thus, no change was made in the data set. Then to determine multivariate outliers, Mahalanobis distances were calculated for 102 variables, and these distance values were compared with the χ^2 table value at the .001 level. 100 values greater than the table value were excluded from the data set. In this way, a total of 326 people remained in the data set. The multivariate normality

assumption was tested with the Barlett test of sphericity. The fact that the Chi-square (χ^2) value was significant at the .01 level as a result of the Bartlett Sphericity Test revealed that the multivariate normality assumption was also met ($\chi^2 = 2903.509, p < .01$). Besides that, to test whether there was a multicollinearity problem, the binary correlations between the variables were calculated, and these values were determined to be below .90. In addition, tolerance and VIF (variance inflation factor) values were calculated. Tolerance values ($1-R^2$) were found between .40 and .80, and VIF values were between 1.260 and 2.520. Based on the tolerance values greater than .20 and the VIF values less than 10, it can be said that there is no multicollinearity between the predictor variables. These results show that the assumptions were satisfied. The goodness-of-fit values of the Academic Dishonesty Tendency Scale (ADTS) obtained with CFA are given in Table 2.

Table 2
Goodness-of-fit Values of the Academic Dishonesty Tendency Scale

RMSEA (90% confidence interval)	SRMR	NNFI	CFI
.07	.06	.96	.96

RMSEA was found to be .07, SRMR was found to be .06, NNFI and CFI were found to be .96. When the goodness-of-fit values given in Table 2 are examined, it is seen that all the values are within acceptable limits for model-data fit. These findings show that the construct validity of the scale has been established in the data obtained from the graduate students.

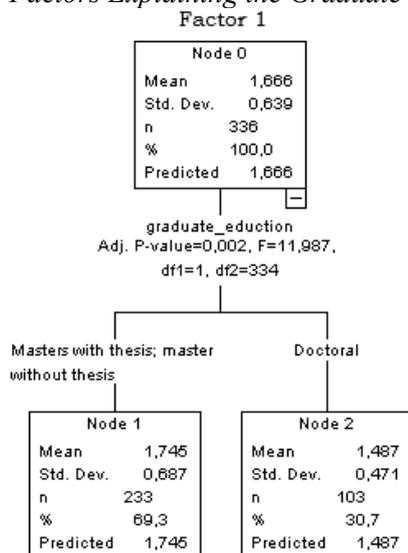
Reliability

The Cronbach Alpha internal consistency coefficient was calculated to be .73 for the subscale of Tendency Towards Cheating, .73 for the subscale of Dishonesty Tendency at Studies as Homework, Project, etc.–common, .67 for the subscale of Dishonesty Tendency at Research and Process of Write up and .72 for the subscale of Dishonesty Tendency Towards Reference. The Stratified Alpha coefficient of the whole scale was .90. The calculated reliability coefficients show that the reliability of each subscale and the whole scale is at a sufficient level. The items can measure the structure to be measured in a consistent manner.

Findings for Second Aim of the Study

The findings related to the second aim of the study are presented separately for each subscale and for the whole scale.

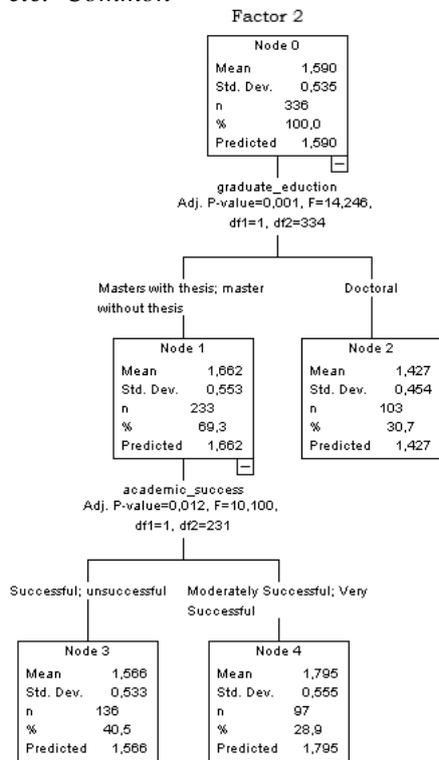
Figure 1
Factors Explaining the Graduate Students' Tendency Towards Cheating Scores



As shown in Figure 1, the mean score taken from the subscale of Tendency Towards Cheating by the graduate students was found to be $\bar{X} = 1.67$. When the mean score is examined, it can be said that the tendency of the students to cheat is at a very low level. The only significant variable explaining the tendency of cheating was found to be the level of graduate education ($F_{(1,334)} = 11.99, p < .05$). As a result of the CHAID analysis, the students who were master's students with and without thesis were gathered in one node, and the students who were doctoral students were gathered in another node. While the mean score of the thesis and non-thesis master's students was found to be $\bar{X} = 1.75$, the mean score of the doctoral students was found to be $\bar{X} = 1.49$. These values show that the master's students with and without thesis have a higher tendency to cheat than the doctoral students and that both groups have a very low tendency to cheat.

Figure 2

Factors Explaining the Graduate Students' Dishonesty Tendency at Studies as Homework, Project, etc.–Common



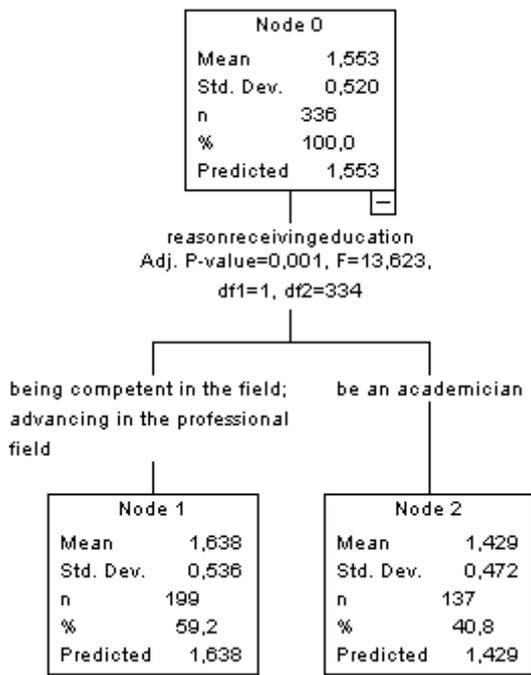
As can be seen in Figure 2, the mean score taken by the graduate students from the subscale of Dishonesty Tendency at Studies as Homework, Project, etc.–common was calculated to be $\bar{X} = 1.59$. This mean score shows that the students' dishonesty tendency at studies as homework, project, etc.–common is very low. The most significant variable explaining the students' dishonesty tendency at studies as homework, project, etc.–common was found to be the level of graduate education ($F_{(1,334)} = 14.25, p < .05$). As a result of the CHAID analysis, the students who were master's students with and without thesis were gathered in one node and the students who were doctoral students were gathered in another node. While the mean score of the thesis and non-thesis master's students was found to be $\bar{X} = 1.66$, the mean score of the doctoral students was found to be $\bar{X} = 1.43$. These values show that the master's students with and without thesis have a higher dishonesty tendency at studies as homework, project, etc.–common than the doctoral students and that both groups have a very low dishonesty tendency at studies as homework, project, etc.–common.

As a result of the CHAID analysis, the variable explaining the dishonesty tendency scores taken by the thesis and non-thesis master's students from the subscale of Dishonesty Tendency at Studies as

Homework, Project, etc.–common was found to be the achievement level ($F_{(1,231)} = 10.10, p < .05$). The achievement levels of the students who were the thesis and non-thesis master’s students were gathered in two separate nodes, one of which was successful-unsuccessful and the other one was moderately successful-very successful. While the mean score of the master’s students who were classified as successful-unsuccessful was found to be $\bar{X} = 1.57$, the mean score of the master’s students who were classified as moderately successful-very successful was found to be $\bar{X} = 1.80$. These values show that the master’s students who are moderately and highly successful have a higher dishonesty tendency at studies as homework, project, etc.–common than the master’s students who are successful and unsuccessful.

Figure 3

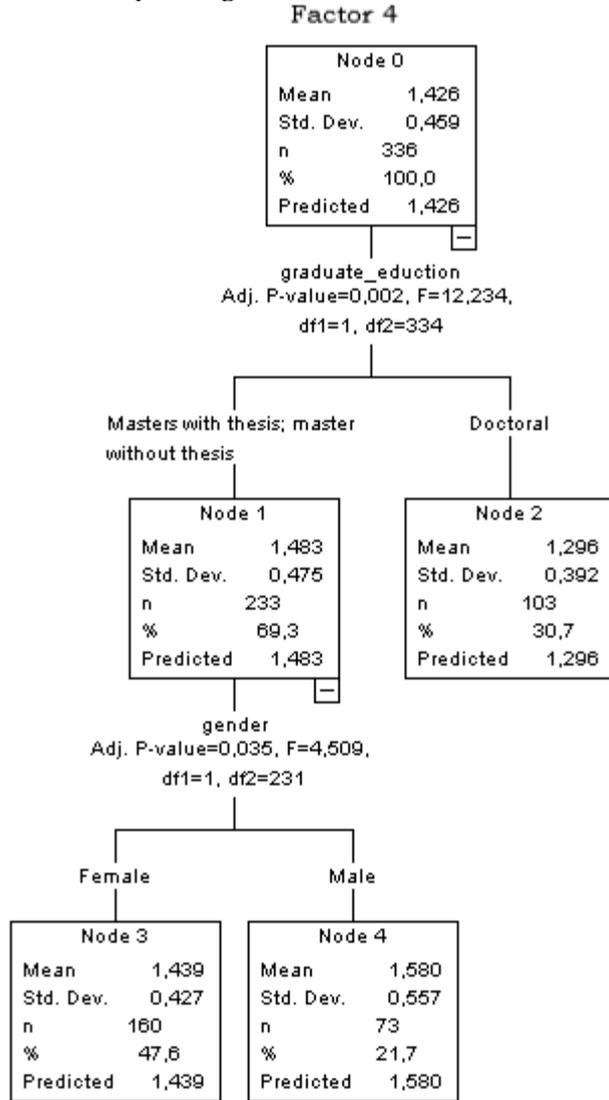
Factors Explaining the Graduate Students’ Dishonesty Tendency at Research and Process of Write up
Factor 3



As shown in Figure 3, the mean score taken by the graduate students from the subscale of the Dishonesty Tendency at Research and Process of Write up was found to be $\bar{X} = 1.55$. When the mean score is examined, it can be said that the dishonesty tendencies of the graduate students in the process of doing research and reporting are at a very low level. The only significant variable explaining the Dishonesty Tendency at Research and Process of Write up was found to be the reason for receiving graduate education ($F_{(1,334)} = 13.62, p < .05$). As a result of the CHAID analysis, the students who received graduate education because of the reasons such as being competent in the field and advancing in the professional field were gathered in one node, and the students who aimed to be an academician were gathered in another node. The mean score of the students who received graduate education because of the reasons such as being competent in the field and advancing in the professional field was found to be $\bar{X} = 1.64$ while the mean score of the students who aimed to be an academician was found to be $\bar{X} = 1.43$. These values show that the dishonesty tendency at research and process of write up of the students who receive graduate education because of the reasons such as being competent in their field and advancing in their professional field are higher than those of the students who receive graduate education to be an academician.

Figure 4

Factors Explaining the Graduate Students' Dishonesty Tendency Towards Reference



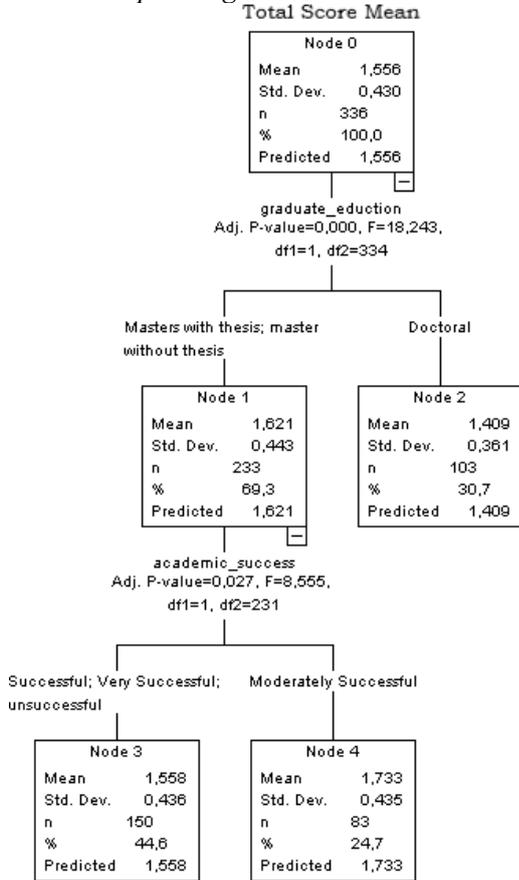
As can be seen in Figure 4, the mean score taken by the graduate students from the subscale of Dishonesty Tendency Towards Reference was found to be $\bar{X} = 1.43$. When the mean score is examined, it can be said that the graduate students' dishonesty tendency towards reference is at a very low level. The most significant variable explaining the graduate students' dishonesty tendency towards reference was found to be the level of graduate education ($F_{(1,334)} = 12.23, p < .05$). As a result of the CHAID analysis, the students who were master's students with and without thesis were gathered in one node, and the students who were doctoral students were gathered in another node. While the mean score of the thesis and non-thesis master's students was found to be $\bar{X} = 1.49$, the mean score of the doctoral students was found to be $\bar{X} = 1.30$. These values show that the master's students with and without thesis have a higher dishonesty tendency towards reference than the doctoral students and that both groups have a very low dishonesty tendency towards reference.

As a result of the CHAID analysis, the variable explaining the dishonesty tendency scores taken by the thesis and non-thesis master's students from the subscale of Dishonesty Tendency Towards Reference was found to be gender ($F_{(1,231)} = 4.51, p < .05$). While the mean score of the students was found to be $\bar{X} = 1.44$, the mean score of the male students was found to be $\bar{X} = 1.59$. These values show

that the male students' dishonesty tendency towards citations is higher than that of the female students and that the tendencies of both groups are very low.

Figure 5

Factors Explaining the Graduate Students' Academic Dishonesty Tendency Scores



As can be seen in Figure 5, the graduate students' mean academic dishonesty tendency score was found to be $\bar{X} = 1.56$. When the mean score is examined, it can be said that the students' academic dishonesty tendency is at a very low level. The most significant factor explaining the students' academic dishonesty tendency was found to be the level of graduate education ($F_{(1,334)} = 18.24, p < .05$). As a result of the CHAID analysis, the students who were master's students with and without thesis were gathered in one node and the students who were doctoral students were gathered in another node. While the mean score of the thesis and non-thesis master's students was found to be $\bar{X} = 1.62$, the mean score of the doctoral students was found to be $\bar{X} = 1.41$. These values show that the master's students with and without thesis have a higher academic dishonesty tendency than the doctoral students and that both groups have a very low dishonesty tendency.

As a result of the CHAID analysis, the variable explaining the dishonesty tendency scores of the thesis and non-thesis master's students was found to be the achievement level ($F_{(1,231)} = 8.56, p < .05$). The achievement levels of the thesis and non-thesis master's students were gathered in two nodes, one of which was unsuccessful-successful-very successful, and the other one was moderately successful. While the mean score of the master's students in the group of unsuccessful-successful-very successful was found to be $\bar{X} = 1.56$, that of the master's students in the group of moderately successful was found to be $\bar{X} = 1.73$. These values show that the academic dishonesty tendency level of the master's students who are moderately successful is higher than that of the students whose achievement level is classified as unsuccessful-successful-very successful and that the academic dishonesty tendencies of both groups are at a very low level.

Discussion and Conclusion

When the CFA results related to the first aim of the current study are examined, it can be said that all the values are within acceptable limits for model-data fit and the construct validity of the ADTS for graduate students is established. The reliability of each subscale of the scale and of the whole scale was found to be adequate, and the scale items were found to be able to measure the construct to be measured in a consistent manner.

When the results related to the second aim of the study are examined, it is seen that the master's students' mean score taken from the subscale of Tendency Towards Cheating is higher than that of the doctoral students and that the cheating tendencies of both groups are at a very low level. Brown, Isbel et al. (2019) and Brown, Isbel et al. (2020) expressed that the undergraduate students scored a higher mean score on current subscale. In the study of Kırıl and Saracalođlu (2018) conducted on undergraduate and graduate students, it was found that undergraduate students' cheating tendency is higher than the graduate students. The reason for the lower level of cheating tendency among the graduate students, it was stated that this could be due to being a teacher. In this study, it can be shown that the reason why the cheating tendency of the thesis and non-thesis master's students have a higher tendency than the doctoral students might be because the doctoral students were conducting more scientific research and they were more involved in academic life. In addition, doctoral students have taken courses on research ethics and their awareness could be higher. As a result of the study, it is suggested that Ethics of Science and Research course should be a compulsory course at undergraduate and graduate levels. Graduate students can be directed to do more academic studies.

The mean score taken from the subscale of Dishonesty Tendency at Studies as Homework, Project, etc.–common by the thesis and non-thesis master's students was found to be higher than that of the doctoral students and dishonesty tendencies of both groups were found to be very low. The dishonesty tendency at studies as homework, project, etc.–common of the master's students who found themselves moderately and very successful was found to be higher than that of the master's students who found themselves successful and unsuccessful. This finding is supported by the study conducted by Eminođlu-Küçüktepe and Küçüktepe (2012) on pre-service history teachers, revealing that the academic dishonesty tendency of the pre-service teachers who found themselves very successful was higher than that of the pre-service teachers who found themselves moderately successful or unsuccessful. On the contrary, Dađaşan et al. (2017) concluded that the academic dishonesty tendency of the students who believed that they were unsuccessful was higher than that of the students who believed that they were successful. Similarly, the students with lower grade point averages were more tended to cheat (Akdađ & Güneş, 2002; Ömür et al., 2014; Taşgın et al., 2019). In this study, it can be suggested that information about the ethical principles that students must comply with while preparing studies as homework or projects etc. should be given in advance and directed to resources such as books, websites or other writing guides that students can benefit from.

The mean score taken from the subscale of the Dishonesty Tendency at Research and Process of Write up by the graduate students who received the graduate education because of the purposes such as being more competent and advancing in their profession was found to be higher than that of the students who received graduate education to be an academician. The dishonesty levels of both group were found to be very low in this subscale. This might be because individuals who start their graduate education in order to become an academician are constantly researching and publishing in their own fields, and they have a high awareness of the necessity of complying with ethical rules in this process. Brown, Bourke-Taylor et al. (2019) reported that the graduate students scored higher academic dishonesty levels on the subscale of the Dishonesty Tendency at Research and Process of Write up. For this study, besides taking a compulsory course of Scientific Research Ethics at the undergraduate level, regular ethics training can be given, and it can be said that the training on literature review and reporting in addition to these pieces of training will contribute to the solution of the problem.

The mean score taken from the subscale of Dishonesty Tendency Towards Reference by the thesis and non-thesis master's students was found to be higher than that of the doctoral students and the

dishonesty tendencies of both groups were found to be very low in this dimension. The dishonesty tendency towards the reference of the male students was found to be higher than that of the female students, and dishonesty tendencies of both the males and females were found to be very low. This finding of the current study is supported by Kırıl and Saracaloğlu (2018), who reported that the mean scores taken from the subscales of Dishonesty Tendency at Studies as Homework, Project, etc.–common and Dishonesty Tendency Towards Reference by the male students are higher than those of the female students. The reason why the male students' dishonesty tendencies were found to be higher than those of the female students was thought to be because female students are more rigorous in preparing their assignments and have a stronger sense of responsibility. Moreover, Belet-Boyacı et al. (2017) also concluded that the mean scores taken from the subscales of Tendency Towards Cheating, Dishonesty Tendency at Studies as Homework, Project, etc.–common, Dishonesty Tendency at Research and Process of Write up and Dishonesty Tendency Towards Reference by the male students are higher than those of the female students. Taşgın et al. (2019) also found that the mean scores taken from the subscale of Dishonesty Tendency at Studies as Homework, Project, etc.–common and from the whole scale by the male students are higher than those of the female students. Similar studies have also revealed that male students have a higher tendency to cheat than female students (Adıbatmaz & Kurnaz, 2017; Akbaşlı et al., 2019; Akdağ & Güneş, 2002; Bateman & Valentine, 2010; Burns, et al., 1998; Chow et al., 2021; Coate & Frey, 2000; Dağışan et al., 2017; Demir & Arcagök, 2013; Eminoğlu-Küçüktepe & Küçüktepe, 2012; Eriksson & McGee, 2015; Ersoy & Özden, 2011; Hadjar, 2019; Hensley et al., 2013; Kadı et al., 2016; Kaymakcan, 2002; Kocaman-Karoğlu & Bakar-Çörez, 2020; Koç, 2018; Lin & Wen, 2007; McCabe & Trevino, 1997; Nonis & Swift, 1998; Ömür et al., 2014; Öztürk-Başpınar & Çakıroğlu, 2019; Özyurt & Eren, 2014; Pino & Smith, 2003; Roig & Caso, 2005; Şenel et al., 2020; Uçak & Ünal, 2015; Underwood & Szabo, 2003; Whitley, 1998; Whitley et al., 1999; Yang et al., 2017; Yangın & Kahyaoğlu, 2009; Yeşilyaprak & Öztürk, 1996). The findings reported in some other studies in the literature are different from this finding of the current study. Kırıl and Saracaloğlu (2018) stated that the academic dishonesty tendency level of the female students in the subscale of Dishonesty Tendency at Research and Process of Write up is higher than that of the male students and that this may be due to the fact that women attach more importance to details. Tayfun et al. (2020) revealed that the female students tended to be more dishonest than the male students in the subscale Dishonesty Tendency at Studies as Homework, Project, etc.–common. Gümüşgül et al. (2013) stated that the female students had higher levels of academic dishonesty in the subscale of Tendency Towards Cheating, but no significant difference was found in the other subscales. Yıldırım (2015) found that females had a higher tendency to cheat than males. On the other hand, when students' frequency of cheating according to gender was examined in the literature, it was observed that females come to the fore in terms of rarely cheating and that males come to the fore in terms of cheating more frequently (Duran, 2020). In addition, there are studies not reporting significant differences between males and females in terms of their cheating tendencies (Ayoub/Al-Salim & Aladwan, 2021; Barın et al., 2018; Çenberci, 2018; Çetin, 2007; Dam, 2013; Keçeci et al., 2011; Lin & Wen, 2007; Novianti, 2022; Pearson, 2019; Szabo & Underwood, 2004; Tümkeya, 2019; Ünlü & Eroğlu, 2012).

When the mean scores taken from the ADTS were evaluated, it was observed that the academic dishonesty tendency level of the thesis and non-thesis master's students was higher than the doctoral students and both groups have very low academic dishonesty levels. The academic dishonesty tendency of the master's students who found themselves moderately successful was found to be higher than that of the master's students who found themselves unsuccessful-successful-very successful. The findings from the current study are similar to previous studies of those male graduate students related with poorer academic performance and higher academic dishonesty incidences (Brown, Isbel et al., 2019; Korn & Davidovitch, 2016; Watson, 2013). In addition, current finding is similar to the findings reported by Eminoğlu-Küçüktepe and Küçüktepe (2012) and Dağışan et al. (2017). Gümüşgül et al. (2013) stated that particularly third-year and fourth-year undergraduate students have more cheating tendency to have higher grade point averages as they wanted to graduate and enter business life as soon as possible. The students with lower grade point averages can be claimed to display a higher level of academic dishonesty (Akdağ & Güneş, 2002; Şenel et al., 2020; Taşgın et al., 2019; Ömür et al., 2014). Dam (2013), on the other hand, stated that as the level of success decreases, the rate of cheating

both *often* and *occasionally* increases, while the rate of cheating *never* decreases. In this current study, precautions regarding quotation, citation, cheating, plagiarism and its types, moral rules, copyright, permission should be taken and applied without stretching. As a result of the study, this research is limited to the variables of gender, undergraduate grade point average, the type of graduate program attended, the stage of the graduate program (course-thesis), the reason for receiving graduate education, the institute attended, and the academic achievement variables used, and this research can be repeated using other variables.

Declarations

Conflict of Interest: No potential conflict of interest was reported by the authors.

Ethical Approval: In this study, all rules stated to be followed within the scope of Higher Education Institutions Scientific Research and Publication Ethics Directive were followed. None of the actions stated under the title of Actions Against Scientific Research and Publication Ethics, were taken.

Name of the board conducting the ethical review: Niğde Ömer Halisdemir University Ethics Committee

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