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The Effect of Multi-Intelligence, Attitude to the Profession and Academic Motivation on Academic Success: A Case Study of Gastronomy and Culinary Arts Students

Aykut Göktuğ Soylu[a*] and Mustafa Aksoy[b]

[a] Kayseri University, Faculty of Applied Sciences, Department of Gastronomy and Culinary Arts, Kayseri, 38000, Turkey
[b] Ankara Hacı Bayram Veli University, Tourism Faculty, Department of Gastronomy and Culinary Arts, Ankara, 06000, Turkey
[*]Corresponding author
soyluaykut93@gmail.com
Tel: +90-553-162-08-90

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Abstract

Only when the variables that create academic achievement align properly can students succeed. Given this, this study aims to reveal the effect of multiple intelligences, academic motivation and attitude towards the profession of undergraduate gastronomy and culinary arts students' on their academic achievement. Through a quota sampling method, research data was collected online from undergraduate students of gastronomy and culinary arts. By performing a missing value analysis, a multivariate sling analysis, and a multivariate normal distribution analysis, this study analyzed a total of 384 valid questionnaires. This study also employed descriptive statistics, exploratory and confirmatory factor analyses, and structural equation modeling. Multiple intelligences of students affected both their attitudes towards the profession and their academic motivation; similarly, their attitudes towards the profession significantly enhanced their academic motivation. Academic motivation of students also had a positive and significant effect on their academic achievement; however, this effect seemed to be very low. This study found that there is an interaction between academic motivation, multiple intelligences, and attitude towards the profession. Yet, academic motivation poorly explained academic achievement. This finding is significantly congruent with the relevant theoretical background, but it ascertains that academic motivation is not a particularly strong factor in influencing academic achievement.

Keywords: Multiple Intelligence; Academic Motivation; Attitude; Academic Achievement; Gastronomy

1 Introduction

Achievement refers to an indicator of the extent to which a student benefits from a particular course or academic program in a school setting. The primary purpose of teaching and educational activities is to ensure that students develop the intended behaviors. This underscores the importance to investigate the extent to which students develop the intended behaviors and to identify the primary factors influencing student achievement based on educational goals (Erdoğdu, 2006). That being said, academic achievement is a concept that affects the entire life of a student. When students succeed, they feel joy, confidence, and fulfillment, whereas failure elicits emotional reactions such as sadness, disappointment, and depression. In-

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deed, previous research reported that students with high academic achievement exhibit fewer antisocial behaviors compared to students with low academic achievement. This makes it crucial to determine the factors affecting the academic achievement of students (Aslanargun et al., 2016).

One of such factors that shape academic achievement is intelligence (Dursun & Dede, 2004). While a precise definition of intelligence is difficult to make (Özekes, 2013), Gardner (2011) defines intelligence as an individual's ability to cope with encountered problems, generate new outcomes among cultural concepts, and create solutions for different and novel problems. Many theories have been proposed to define and measure intelligence. One of them is the Theory of Multiple Intelligences. The Theory of Multiple Intelligences posits that intelligence is not a directly measurable phenomenon represented by a single number. Accordingly, this theory argues that classical intelligence tests and IQ scores fail to adequately measure intelligence. According to the Theory of Multiple Intelligences, intelligence is divided into different domains. Each domain of intelligence contains its unique abilities. These domains of intelligence can work together as well as separately (Gardner, 1987).

Academic motivation refers to a mental strength or an internal energy required for a student to achieve a goal (Sternberg & Williams, 2010). The concept of motivation essentially resides within the domain of self-determination or, more commonly, within the domain of self-efficacy. Thus, Self-Determination Theory focuses on the reasons that prompt an individual to act towards a phenomenon. Self-Determination Theory informs that an individual can be internally or externally-motivated, or they may lack motivation altogether (Ryan & Deci, 2000a). According to the Self-Determination Theory, internally-motivated individuals are more successful than externally-motivated ones. Moreover, when there is a lack of motivation, failure is more likely to occur (Ryan & Deci, 2000b).

One of the fundamental factors affecting the academic achievement of individuals is their attitudes towards the profession. Professional attitude encompasses the feelings of an individual about their chosen profession. Having a positive attitude towards their profession enables individuals to be more successful during their academic years. (Terzi & Tezci, 2007). Maxwell (1996) defines attitude as an inner feeling that manifests in one's behavior. As for the characteristics of attitude, they are largely shaped by experiences, and change under the influence of environmental conditions as well as through education (Eren, 2008). In other words, the key characteristic of attitudes is that they are learnable (Kozak & Kızılırmak, 2001).

This present study investigates multiple intelligences, factors related to academic motivation, and attitude towards the profession as predictors of academic achievement of gastronomy and culinary arts students. The distinctiveness of this study is that it offers valuable insights for the literature into the effects of multiple intelligences, factors related to academic motivation, and attitude towards the profession on the academic achievement of undergraduate gastronomy and culinary arts students'. For this reason, the greatest contribution of this study is that it fills the gap in the literature on determining the multiple intelligences of undergraduate gastronomy and culinary arts students' and identifies factors related to their academic motivation and attitude towards the profession, thus underscoring the importance of multiple intelligences, academic motivation and attitude towards the profession in the field of gastronomy and culinary arts.

According to Gardner (2011), intelligence is a part of a whole that is too complex to be determined in a few minutes or by a few tests, cannot be reduced to a single number, and is both interconnected and separate from each other, like the branches of a tree. Hence, an approach that determines success in educational institutions only through IQ scores or tests that highlight verbal and numerical abilities, measures only numerical and verbal intelligence and values the results of such scores and tests would not be the most suitable (Gardner, 2011). Numerous studies in the relevant literature (Azar, 2006; Bora-Kılınçarslan et al., 2019; Kural, 2020; Yurt & Bozer, 2015) support this approach. These studies identified a strong relationship between the educational approach to the theory of multiple intelligences and academic achievement.

Eyyam et al. (2010) reported a positive and sig-

nificant relationship between verbal intelligence levels of students and their academic achievement. Bora-Kılınçarslan et al. (2019) indicated a positive, albeit statistically weak, relationship between logical intelligence, visual intelligence, intrapersonal intelligence and naturalistic intelligence in an Accounting I course. Kurt et al. (2011) further revealed that there is a positive and significant relationship between students' success in a biology course and their levels of visual and naturalistic intelligence. Similarly, Kural (2020) stated that students' education on the theory of multiple intelligences has a significant effect on their success in science courses. The meta-analysis conducted by Yurt and Bozer (2015), showed that educational practices based on the theory of multiple intelligences have a very strong impact on academic achievement.

Moreover, various studies found out that the educational approach to the theory of multiple intelligences shapes academic motivation and attitude towards the profession, as well as academic achievement (Moenikia & Zahed-Babelan, 2010; Piaw et al., 2014; Ryue et al., 2013). Indeed, it is reported that intelligence is not the sole determinant of academic achievement. High academic motivation is associated with lower school dropout rates and increased student achievement (Moenikia & Zahed-Babelan, 2010). Also, education tailored to different multiple intelligence levels of students positively affects their academic motivation and attitude towards their field of education (Ryue et al., 2013).

Following the explanations given above, we propose that the multiple intelligence levels of undergraduate gastronomy and culinary arts students' potentially affect their academic motivation, attitude towards the profession, and academic achievement. Given this, this study formulates the following hypotheses:

1: The multiple intelligences of undergraduate gastronomy and culinary arts students' significantly and positively affect their academic motivation.

2: The multiple intelligences of undergraduate gastronomy and culinary arts students' significantly and positively affect their attitude towards the profession.

Although motivation is typically considered as a singular entity, even a slight change in motivation can cause individuals to have very different experiences and to change their thoughts on the subject they are motivated by. Individuals may be motivated also because they value an activity or when they are externally forced. They may act in a certain way either due to a desire for being superior or fear of being accused. With that said, there are pronounced differences between having internal motivation and having external motivation or not finding any motivating elements related to an activity, and these differences are a matter of significance in every culture (Ryan & Deci, 2000a). This implies that different forms of motivation can affect the attitude towards the profession one is trained for in various manners. For example, several studies discovered that intrinsic motivation positively affects the attitude towards the profession, while the lack of motivation, where the impact of external motivation is less significant, negatively affects the attitude towards the profession (Clark et al., 2014; Howard et al., 2021).

The opportunities provided by educational institutions play a pivotal role in helping students develop a positive attitude towards this profession during and after the training on the gastronomy profession (Kurnaz & Kurnaz, 2014). From this perspective, the positive attitude developed by students towards the profession impacts their academic and professional achievement (Terzi & Tezci, 2007). Previous studies indicated that the attitude towards the profession affects academic motivation too (Akkuzu & Akçay, 2011; Zembat et al., 2018).

Consistent with the above findings, this study suggests that different types of academic motivation of undergraduate students of gastronomy and culinary arts affect their attitudes towards the profession in different ways. Moreover, there are instances where attitude towards the profession impacts academic motivation. Therefore, this may warrant the existence of an interplay of these factors. Given this, this study formulates the following hypothesis:

3: The attitudes towards the profession of undergraduate gastronomy and culinary arts students' significantly and positively affect

their academic motivation.

Academic motivation is a driving force that encourages attendance at school and completion of studies. While multiple theories that explain motivation exist, Deci and Ryan's Self-Determination Theory (SDT) stands out as more prominent. The main reason for this is that motivation in this theory is conceptualized into three dimensions: intrinsic, extrinsic and lack of motivation. This allows for an in-depth analysis of motivational factors that an individual has (Clark et al., 2014). There is an extensive body of research dedicated to understanding how different forms of academic motivation affect academic achievement (Amrai et al., 2011; Fortier et al., 1995; Howard et al., 2021). Some of these studies ascertained that internal and external factors of motivation boost academic achievement (Amrai et al., 2011; Guay et al., 2010). In addition, there are few studies in the literature reporting that lack of motivation results in lower academic achievement (Howard et al., 2021). In fact, Howard et al. (2021) elucidated that intrinsic motivation has something to do with academic achievement, while lack of motivation impairs academic achievement.
Consistent with the above findings, this study suggests that different types of academic motivation of undergraduate gastronomy and culinary arts students' affect their academic achievement in different ways. Given this, this study presents the following hypothesis:

4: The academic motivation of undergraduate gastronomy and culinary arts students' significantly and positively affect their academic achievement.

2 Materials and Methods

2.1 Sample Selection Process

In this study, the population consists of all university students enrolled in gastronomy and culinary arts programmes at the undergraduate level in Turkey that admit students based on verbal scores. This study initially determined that there were 4573 available slots, but only 3943 students were enrolled in departments of gastronomy and culinary arts for the academic year 2021-2022 at the undergraduate level, and that out of the 4568 available slots, 4539 students were enrolled for the academic year 2022-2023 (Council of Higher Education (YÖK), 2023). Given the statistics of the last four years, a total of more than 10,000 students had enrolled in departments of gastronomy and culinary arts. According to Sekaran and Bougie (2003), if the universe size is 10,000 or above, a sample size of 384 people is considered sufficient. Therefore, this study drew on the formula for the infinite universe ($n = p{\cdot}q{\cdot}z^2 \ / \ h^2$) to determine the sample size (Ergin, 1992). Considering the ratio that maximizes the sample size (p: 0,50), this study determined a sample size of 384 people with a 5% level of significance and 5% sampling error. The selection of programs for inclusion in this sample was based on specific criteria. First, gastronomy and culinary arts programs within universities were first divided by regions, and then programs from each region were ranked within their own regions, based on their base scores in the Higher Education Institutions Exam (YKS) for 2022 from highest to lowest. As this study is designed as a cross-sectional study, it was deemed necessary to check whether universities have been admitting students to the relevant programs for the past four academic years since 2018-2019, according to the Higher Education Institution data. Programs that have not recruited students for the last 4 years were not included in the sample. The sample included currently enrolled students. The resulting research sample included the following undergraduate programs of gastronomy and culinary arts: Balıkesir University in the Marmara Region, Ankara Hacı Bayram Veli University in the Central Anatolia Region, Dokuz Eylül University in the Aegean Region, Kastamonu University in the Black Sea Region, Mardin Artuklu University in the Southeastern Anatolia Region, Atatürk University in the Eastern Anatolia Region, and Mersin University in the Mediterranean Region. With this sample, this study drew on a quota sampling method, which is one of the non-probability sampling techniques. The total number of undergraduate students of gastronomy and culinary arts in the selected seven universities was found to be

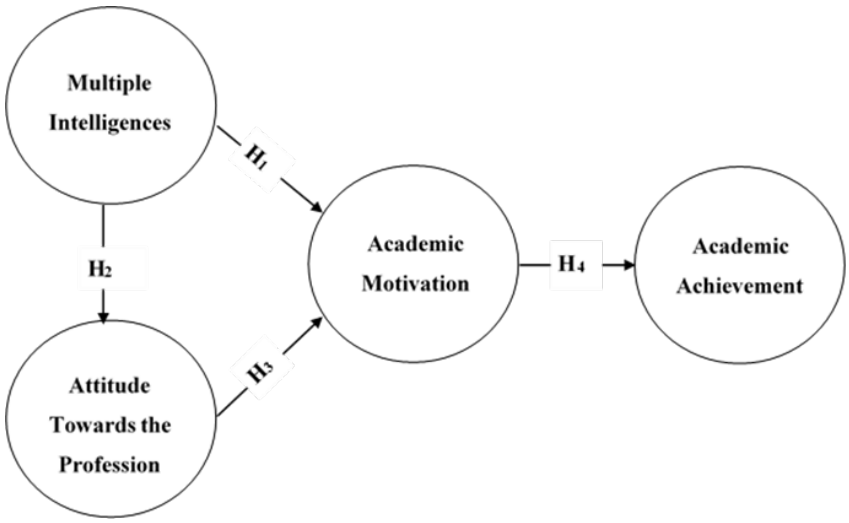

Figure 1: Symbolic Representation of the Research Model

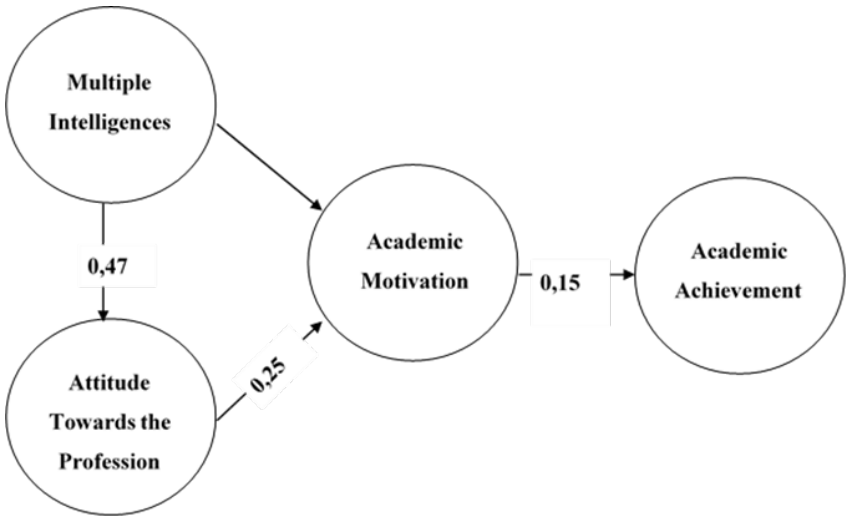

Figure 2: Path Analysis of the Structural Equation Model and Symbolic Representation of Impact Values.

Table 1: Quotas and actual numbers per university

University	Number of Students	%	n	Margin
Ankara Hacı Bayram Veli University	378	17.5	68	0
Balıkesir University	230	10.6	41	1
Dokuz Eylül University	315	14.6	56	0
Kastamonu University	259	12	46	0
Mardin Artuklu University	278	13	50	-8
Atatürk University	332	15.4	59	-4
Mersin University	363	16.8	64	11
Total	2155	100	384	384

2,155 for the 2022-2023 academic year. Next, the quota for the number of undergraduate gastronomy and culinary arts students' to be included in the sample was distributed by considering the number of students studying in each undergraduate program. Table 1 includes the quota numbers determined according to the number of students at universities and their implementation status.

2.2 Scales

To identify the multiple intelligences of the participants, the Multiple Intelligences Profiling Questionnaire III (MIPQ III) by (Tirri & Nokelainen, 2008) was adapted to Turkish. The MIPQ III consists of 35 items. It is composed of four items to measure each of the eight intelligence clusters and three items to measure naturalistic intelligence. The nine intelligence clusters are, in order: Visual, mathematical, internal, existential, rhythmic, social, physical, verbal and naturalistic intelligence. Participants identify their own intelligence clusters by selecting the option that best suits them in the scale items. To assess the academic motivation of the students, this study applied the Academic Motivation Scale. This scale was designed by Fortier et al. (1995) and adapted to Turkish by Karagüven (2012). When examining the items in the lack of motivation dimension, it is seen that they are reversed compared to other items. However, when scoring, these items are scored like the others. In this context, there are no items that are scored in reverse on the scale. The statements that make up the other dimensions are positive (Karagüven, 2012). To evaluate the attitudes of gastronomy and culinary arts students' towards the profession, the questionnaire used by Roney and Öztin (2007) in their "Career Perceptions of Undergraduate Tourism Students: A Case Study in Turkey" study was adapted to Turkish and modified to suit the context of gastronomy and culinary arts. All scales were used in a 5-point Likert format. Lastly, academic achievement was operationalized using the student's cumulative grade point average (GPA) (0-4). Grades were collected based on participants' statements and used as an observed variable in the structural model. No items from the motivation scale were included under 'academic achievement'; thus, discriminant validity was preserved. Additionally, since the academic achievement variable was measured by the students' self-reported grade point average (GPA) and evaluated as a single item, structural validity/reliability coefficients were not calculated. It was used as an observed variable in the structural model.

2.3 Data Collection and Preparation

With no discrepancies identified, all three scales were deemed satisfactory. The next step involved data collection and preparation. While the first stage of the data collection was planned to be carried out through face-to-face interviews and the drop-collect method, a national decision was made to continue university education remotely due to the earthquake that happened in Turkey.

For this reason, the survey was digitalized for online administration and data were collected between May 1, 2023 and June 1, 2023. Data were gathered from a total of 407 individuals. Following missing value analysis, multivariate outlier analysis, and multivariate normal distribution analysis, a total of 23 surveys were removed from the data set. Multivariate outlier analysis was performed by calculating the Mahalanobis distance values of the items. As a result of the analysis, 9 questionnaires with values higher than the critical t-value (3.361) at a 0.01 significance level within the academic motivation scale, 6 questionnaires within the MIPQ III (3.551) scale, and 8 questionnaires within the career attitude scale (4.318) were excluded from the research data. Thus, descriptive statistics, exploratory and confirmatory factor analysis and structural equation modeling (CB-SEM) were performed on the remaining 384 surveys.

3 Results and Discussion

3.1 Participant Profile

65.1% of the students participating in the study were female, while 34.9% were male. 17.7% of the students were from Ankara Hacı Bayram Veli University, 10.9% from Balıkesir University, 14.6% from Dokuz Eylül University, 12% at Kastamonu University, 10.9% at Mardin Artuklu University, 14.3% at Atatürk University, and 19.5% at Mersin University. 26.3% of students are in their first year, 30.2% are in their second year, 21.9% are in their third year, and 21.6% are in their fourth year. Gastronomy and culinary arts is the first choice for 67.4% of students, while 32.6% did not list it as their first choice. The grade point average (GPA) (0-4) of the students is as follows: 1.3% stated that their GPA was 0.00-1.00, 6.5% stated that their GPA was 1.01-2.00, 47.9% stated that their GPA was 2.01-3.00, and 44.2% stated that their GPA was 3.01-4.00.

3.2 Reliability Analysis

For a scale to be considered reliable, Cronbach's Alpha coefficient must be between 0.700 and 0.800 (Mayers, 2013). Furthermore, the item-total correlation must be positive and higher than 0.250 (Kalaycı, 2010). In this context the reliability analysis, which was to be carried out separately for the scales in the survey, was conducted first on the Academic Motivation Scale. The Cronbach's Alpha of the Academic Motivation Scale, measuring its internal consistency, was 0.905. However, as the results identified an item below the critical threshold of 0.250, it was removed from the scale. The following Cronbach's Alpha coefficient was found as 0.906. The range of corrected item-total correlations of the 27 items in the scale was 0.256-0.707.
The second scale in the survey form, that is the Multiple Intelligences Profiling Questionnaire, was also tested for reliability. The Cronbach's Alpha of this scale was determined as 0.903. The range of corrected item-total correlations of this scale was 0.262-0.577.
Similarly, this study performed reliability analysis on the attitude towards the profession scale, which was included as the third scale in this study. The Cronbach's Alpha coefficient was found as 0.724. Yet, five items with corrected item-total correlation values below the critical threshold of 0.250, were removed from the scale. The following reliability analysis showed that the Cronbach's Alpha coefficient was found as 0.776. The range of corrected item-total correlations of this scale was 0.258-0.633.

3.3 Exploratory Factor Analysis

Firstly, an exploratory factor analysis was applied to the academic motivation scale. The results of the exploratory factor analysis yielded a four-factor structure, as in its Turkish version developed earlier (Karagüven, 2012). This four-factor structure explains 58.222% of the total variance. Two items in the Academic Motivation Scale were excluded from the analysis, as they overlapped. It was notable that some items in the Academic Motivation Scale were loaded to other dimensions, as in the Turkish version. As found in the study by (Karagüven, 2012), the items of "external motivation, self-validation" and "internal motivation, achievement" in the original scale were included together within different fac-

tors. For this reason, in this study this factor was called "self-validation and achievement", as in its Turkish version. Moreover, the result of the Kaiser-Meyer-Olkin (KMO) test was above 0.60 (0.897) and the results of the Bartlett's Sphericity Test ($p<0.05$) were significant. In addition, items with a communality ratio below 0.50 were retained for the analysis based on their factor loadings. Table 2 includes the results of the exploratory factor analysis for the Academic Motivation Scale.

This study, then, applied exploratory factor analysis on the Multiple Intelligences Profiling Scale adapted to Turkish. The exploratory factor analysis yielded a seven-factor structure, differing from the original English scale. This seven-factor structure explains 64.659% of the total variance. Unlike the original English scale that builds on nine different types of intelligence, the Turkish version combines both visual and mathematical intelligence into a single factor and internal and existential intelligence into a single factor. For that reason, these factors are presented together. Accordingly, the first factor is called visual-mathematical intelligence, and the second factor is named internal-existential intelligence. Since the other factors yielded the same structure as in the original English scale, they were directly translated into Turkish. However, five items were excluded from the analysis because they overlapped. Also, it is important to note that the result of the Kaiser-Meyer-Olkin (KMO) test was above 0.60 (0.866) and the results of the Bartlett's Sphericity Test ($p>0.05$) were significant. In addition, items with a communality ratio below 0.50 were retained for the analysis based on their factor loadings. Table 3 includes the results of the exploratory factor analysis for the Multiple Intelligences Profiling Scale.

This study performed exploratory factor analysis on the Turkish version of the attitude towards the profession scale. The analysis revealed a single-factor structure, as in the original English scale, and this structure explains 65.649% of the total variance. Two items in the original English scale were excluded from the analysis, as they overlapped. Moreover, the result of the Kaiser-Meyer-Olkin (KMO) test was above 0.60 (0.860) and the results of the Bartlett's Sphericity Test ($p>0.05$) were significant. Table 4 shows the results of the exploratory factor analysis of the attitude towards the profession scale.

3.4 Confirmatory Factor Analysis

In the study, confirmatory factor analysis and structural equation modelling were conducted using the CB-SEM approach with LISREL. For a fit, Normalized Chi-Square, RMSEA, GFI, SRMR, CFI, NFI, NNFI, IFI, RFI and CAIC were reported. The results of the confirmatory factor analyses applied to all three scales indicated that the lowest AVE value for the latent variables in the measurement model was 0.41, whilst the lowest CR value was 0.74. According to Fornell and Larcker (1981), although the AVE value is below 0.50, provided that the CR value is above 0.70, this indicates an acceptable value. Accordingly, for the values obtained in this study, it seems that the items present a mediocre convergent validity with the relevant structure and that the reliability values of the dimensions are above the threshold value. Table 5 presents the results of the confirmatory factor analysis of the measurement model.

After confirmatory factor analysis, this study examined the goodness-of-fit indices for the measurement model. To do so, this study examined the indices, including Normalized Chi-Square, RMSEA, GFI, SRMR, CFI, NFI, NNFI, IFI, RFI and CAIC, to illustrate the adequacy of the measurement model. Remarkably, all values, except for GFI, exceeded acceptable reference thresholds. For that reason, the measurement tool is deemed satisfactory. Table 6 includes the goodness-of-fit statistics for the measurement model in the confirmatory factor analysis.

3.5 Second-Order Confirmatory Factor Analysis

Following the second-order confirmatory factor analysis, this study examined the fitness values of the variables for academic motivation, multiple intelligences and attitude towards the profession. It determined that the relevant values were comparable to the first-order confirmatory factor analysis and that the model falls within

Table 2: Descriptive Factor Analysis of the Academic Motivation Scale

Factors	**Factor Loading**	**Communality**	**Eigenvalue**	**Mean**	**Explained Variance %**	**Alpha**
Factor 1: Internal Motivation			4.299	3.9420	17.197	0.863
18) For the pleasure that I experience when I feel completely absorbed by what certain authors have written.	0.740	0.650		3.4471		
25) For the "high" feeling that I experience while reading about various interesting subjects.	0.718	0.666		3.8484		
11) For the pleasure that I experience when I read interesting authors.	0.695	0.565		3.6342		
2) Because I experience pleasure and satisfaction while learning new things.	0.659	0.492		4.4193		
16) For the pleasure that I experience in expanding my knowledge about subjects which appeal to me.	0.648	0.568		4.2630		
4) For the intense feelings I experience when I am communicating my own ideas to others.	0.631	0.450		3.5807		
9) For the pleasure I experience when I discover new things I've never seen before.	0.589	0.593		4.2422		
13) For the pleasure that I experience while I am surpassing myself in one of my personal achievements.	0.515	0.520		4.1016		
Factor 2: External Motivation			3.370	4.2268	15.082	0.834
8) In order to obtain a more prestigious job later on.	0.739	0.625		4.1719		
15) Because I want to have "a good life" later on.	0.730	0.565		4.5011		
17) Because this will help me make a better choice regarding my career orientation.	0.688	0.593		4.2301		
22) In order to have a higher salary in the future.	0.676	0.543		3.9815		
10) Because eventually it will enable me to enter the job market in a field that I like.	0.644	0.485		4.1409		
24) Because I believe that a few additional years of education will improve my competence as a worker.	0.590	0.561		4.2214		
3) Because I think that a college education will help me better prepare for the career I have chosen.	0.575	0.477		4.3411		
Factor 3: Self-Validation and Achievement			3.388	3.3433	13.550	.0834
21) To show myself that I am an intelligent person.	0.791	0.665		2.8795		
28) Because I want to prove myself that I can succeed in my studies.	.746	0.699		3.5547		
27) Because college allows me to experience a personal satisfaction in my quest for excellence in my studies.	0.641	0.607		3.6943		
7) To prove to myself that I am capable of completing my college degree.	0.633	0.474		2.8766		
20) For the satisfaction I feel when I am in the process of completing difficult academic activities.	0.608	0.573		3.0521		
14) Because of the fact that when I succeed in college I feel important.	0.565	0.564		4.0026		
Factor 4: Lack of Motivation			3.098	3.3445	12.393	0.835
26) I don't know; I can't understand what I am doing in school.	0.831	0.714		4.0858		
19) I can't see why I go to college and frankly, I couldn't care less.	0.804	0.691		1.8226		
12) I once had good reasons for going to college; however, now I wonder whether I should continue.	0.803	0.652		3.7474		
5) Honestly, I don't know; I really feel that I am wasting my time in school.	0.731	0.562		3.7222		

Principal component analysis with Varimax rotation; Explained total variance=58.222%
The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy= 0.897 (89.7%)
The Bartlett's Sphericity Test= 4574.475; sd.= 300; p= 0.0001
Overall mean= 3.8756 ; Standard deviation: 1.086302 ; n=384; Alpha for the whole scale: 0.884;
Reaction Categories; 1= Does not correspond at all,..., 5= Corresponds exactly

Table 3: Descriptive Factor Analysis of the Multiple Intelligences Profiling Questionnaire

Factors	Factor Loading	Communality	Eigenvalue	Mean	Explained Variance %	Alpha
Factor 1: Visual-Mathematical Intelligence			3.545	3.2310	11.816	0.835
7) Mental arithmetic is easy for me.	0.821	0.705		3.0599		
6) I can work with and solve complex problems.	0.750	0.677		3.4661		
8) I am good at games and problem solving, which requires logical thinking.	0.725	0.574		3.6146		
5) At school I was good at mathematics, physics or chemistry.	0.702	0.569		2.2461		
9) At school, geometry and various kinds of assignments involving spatial perception were easier for me than solving equations.	0.621	0.491		3.0625		
10) It is easy for me to conceptualize complex and multidimensional patterns.	0.620	0.631		3.5078		
11) I can easily imagine how a landscape looks from a bird's-eye view.	0.537	0.607		3.6605		
2. Factor: Internal-Existential Intelligence			3.069	3.9974	10.231	0.798
31) I often reflect on the meaning of life.	0.736	0.593		3.9766		
29) In midst of busy everyday life I find it important to contemplate.	0.698	0.658		4.1380		
28) I like to read psychological or philosophical literature to increase my self-knowledge.	0.615	0.532		3.6719		
27) I spend time regularly reflecting on the important issues in life.	0.575	0.523		4.0860		
26) I often think about my own feelings and sentiments and seek reasons for them.	0.538	0.484		4.1146		
Factor 3: Rhythmic Intelligence			3.040	3.3857	10.132	0.873
18) When listening to music, I am able to distinguish instruments or recognize melodies.	0.850	0.775		3.5703		
19) I can easily keep the rhythm when drumming a melody.	0.847	0.767		3.5365		
17) After hearing a tune once or twice I am able to sing or whistle it quite accurately.	0.814	0.711		3.4674		
20) I notice immediately if a melody is out of tune.	0.787	0.676		2.9688		
Factor 4: Physical Intelligence			2.961	4.1849	9.868	0.813
16) I was good at handicrafts at school.	0.769	0.676		4.1693		
15) I am good at showing how to do something in practice.	0.756	0.664		4.2839		
14) I can easily do something concrete with my hands (e.g. knitting and woodwork).	0.739	0.675		4.3490		
13) I am a handy person.	0.678	0.565		3.9375		
Factor 5: Social Intelligence			2.808	3.8476	9.358	0.850
23) I easily connect with others.	0.876	0.820		3.8906		
21) Even in strange company, I easily find someone to talk to.	0.820	0.756		3.6016		
22) I get along easily with different types of people.	0.782	0.737		3.8229		
24) In negotiations and group work, I am able to support the group to find a consensus.	0.600	0.596		4.0755		
Factor 6: Naturalistic Intelligence			2.136	4.3892	7.119	0.819
34) Protecting the nature is important to me.	0.800	0.791		4.4896		
35) I pay attention to my consumption habits in order to protect the environment.	0.764	0.704		4.2995		
33) I enjoy the beauty and experiences related to nature.	0.604	0.653		4.3785		
Factor 7: Verbal Intelligence			1.840	3.8927	6.134	0.631
2) At school, studies in native language or social studies were easier for me than mathematics, physics and chemistry.	0.765	0.631		3.9632		
1) Writing is a natural way for me to express myself.	0.694	0.587		3.6629		
4) Metaphors and vivid verbal expressions help me learn efficiently.	0.694	0.572		4.0521		

Principal component analysis with Varimax rotation; Explained total variance=64,659%
The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy= .866 (86,6%)
The Bartlett's Sphericity Test= 5347.687; sd= 435 ; p= 0.0001
Overall mean= 3.7781; Standard deviation: 1.070788 ; n=384; Alpha for the whole scale; 0.903
Response options are as follows: 1: Strongly disagree, ..., 5: Strongly agree

Table 4: Exploratory Factor Analysis of the Attitude towards the Profession Scale

Factors	Factor Loading	Communality	Eigenvalue	Mean	Explained Variance %	Alpha
Factor 1: Attitude towards the Profession			3.282	4.2291	65.649	0.776
1) Meeting new people by working in tourism is a pleasant experience.	0.852	0.616		4.2161		
2) One can earn a lot by working in tourism.	0.837	0.676		4.2943		
3) To study tourism management at the university level is a correct investment in career development.	0.822	0.700		4.2786		
4) Promotion opportunities are satisfactory in the tourism industry.	0.785	0.725		4.3568		
5) In general, the advantages of working in the tourism industry outweigh its disadvantages.	0.751	0.565		3.9998		

Principal component analysis with Varimax rotation; Explained total variance=65.649%
The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy= 0.860 (86%)
The Bartlett's Sphericity Test= 876.614; sd.= 10; p= 0.0001
Overall mean= 4.2291; Standard deviation: 0.928658; n=384; Alpha for the whole scale: 0.776
Response options are as follows: 1: Strongly disagree, ..., 5: Strongly agree

acceptable values. Table 7 presents the values pertaining to academic motivation, multiple intelligences, and attitude towards the profession. The results of the path analysis and the goodness-of-fit indices of the structural model were examined together. To assess the adequacy of the structural model, normalized Chi-Square, MSEA, GFI, SRMR, GFI, CFI, NFI, NNFI, IFI, RFI and CAIC values were taken into consideration. All the values were found to be within the range of acceptable reference values. For this reason, the structural model proposed by this study demonstrates an acceptable level of overall goodness-of-fit. Table 8 presents the goodness-of-fit indices of the proposed model.

3.6 Hypothesis Testing

The variables were incorporated into the model in the order of hypothesis testing. Once the entire model was established, this study examined the significance of the relationships between the variables, the standard error values, the regression coefficient and R^2 value, which indicates the exploratory power of independent variables on dependent variables. Table 9 presents the results of the path analysis.

The table shows that multiple intelligences had a positive and significant effect on academic motivation (β= 0.53; p$\leq$ 0.001). Moreover, attitude towards the profession had a positive and significant effect on academic motivation (β= 0.25; p$\leq$ 0.001). Another remarkable finding is the positive and significant effect of multiple intelligences on attitude towards the profession (β= 0.47; p$\leq$0.001). Academic motivation also had a positive and significant effect on academic achievement (β= 0.15; p$\leq$ 0.001). Therefore, the hypotheses H1, H2, H3 and H4 are all supported. Using the model tested in this study, this study revealed that the multiple intelligences and attitudes towards the profession of the undergraduate gastronomy and culinary arts students' explain 47% of their academic motivation. Further, the multiple intelligences of the students explained 22% of their attitudes towards the profession. A final finding of this study is that the academic motivation of these students explained 2% of their academic achievement. Figure 2 shows the results of the visual path analysis of the model.

3.7 Discussion

In this study, remarkably, the four dimensions of internal motivation, external motivation, self-validation and achievement, and lack of motivation are evolved from seven different motivation dimensions of academic motivation. The self-validation and achievement di-

Table 5: Statistics on the Confirmatory Factor Analysis Measurement Model

Dimensions and Items	Standardized Factor Loading	Error Margin	t-value	AVE	CR
Internal Motivation				0.44	0.86
Internal Motivation1	0.71	0.49	15.,43		
Internal Motivation2	0.79	0.37	18.03		
Internal Motivation3	0.67	0.55	14.28		
Internal Motivation4	0.55	0.70	11.16		
Internal Motivation5	0.68	0.53	14.65		
Internal Motivation6	0.58	0.66	11.93		
Internal Motivation7	0.70	0.51	15.17		
Internal Motivation8	0.64	0.59	13.45		
External Motivation				0.41	0.83
External Motivation1	0.61	0.58	13.49		
External Motivation2	0.61	0.63	12.36		
External Motivation3	0.74	0.45	16.07		
External Motivation4	0.53	0.72	10.46		
External Motivation5	0.61	0.62	12.53		
External Motivation6	0.74	0.46	15.91		
External Motivation7	0.66	0.56	13.83		
Self-Validation and Achievement				0.51	0.83
Self-Validation and Achievement1	0.62	0.62	12.65		
Self-Validation and Achievement2	0.82	0.33	18.61		
Self-Validation and Achievement3	0.80	0.36	17.96		
Self-Validation and Achievement4	0.63	0.60	12.97		
Self-Validation and Achievement5	0.69	0.52	14.70		
Lack of Motivation				0.56	0.83
Lack of Motivation1	0.82	0.32	18.31		
Lack of Motivation2	0.81	0.34	17.97		
Lack of Motivation3	0.72	0.48	15.23		
Lack of Motivation4	0.63	0.60	12.92		
Visual-Mathematical Intelligence				0.42	0.83
Visual-Mathematical Intelligence1	0.77	0.41	16.67		
Visual-Mathematical Intelligence2	0.70	0.50	14.77		
Visual-Mathematical Intelligence3	0.68	0.53	14.18		
Visual-Mathematical Intelligence4	0.60	0.64	12.14		
Visual-Mathematical Intelligence5	0.59	0.66	11.72		
Visual-Mathematical Intelligence6	0.63	0.61	12.75		
Visual-Mathematical Intelligence7	0.58	0.67	11.48		
Internal-Existential Intelligence				0.45	0.80
Internal-Existential Intelligence1	0.64	0.59	13.11		
Internal-Existential Intelligence2	0.76	0.43	16.31		
Internal-Existential Intelligence3	0.63	0.60	12.80		
Internal-Existential Intelligence4	0.69	0.52	14.53		
Internal-Existential Intelligence5	0.66	0.57	13.51		
Rhythmic Intelligence				0.63	0.87
Rhythmic Intelligence1	0.84	0.29	19.39		
Rhythmic Intelligence2	0.85	0.28	19.73		
Rhythmic Intelligence3	0.77	0.41	17.12		
Rhythmic Intelligence4	0.73	0.46	15.94		
Physical Intelligence				0.53	0.82
Physical Intelligence1	0.76	0.43	16.30		
Physical Intelligence2	0.78	0.38	17.09		
Physical Intelligence3	0.78	0.39	17.01		
Physical Intelligence4	0.60	0.64	12.10		
Social Intelligence				0.60	0.85
Social Intelligence1	0.88	0.23	20.47		
Social Intelligence2	0.80	0.36	18.05		
Social Intelligence3	0.78	0.39	17.27		
Social Intelligence4	0.63	0.60	13.08		
Naturalistic Intelligence				0.62	0.83
Naturalistic Intelligence1	0.88	0.23	19.98		
Naturalistic Intelligence2	0.74	0.45	15.96		
Naturalistic Intelligence3	0.75	0.44	16.14		
Verbal Intelligence				0.49	0.74
Verbal Intelligence1	0.70	0.51	11.49		
Verbal Intelligence2	0.56	0.68	9.78		
Attitude Towards the Profession				0.57	0.87
Attitude Towards the Profession1	0.73	0.47	15.76		
Attitude Towards the Profession2	0.76	0.43	16.64		
Attitude Towards the Profession3	0.81	0.34	18.43		
Attitude Towards the Profession4	0.81	0.34	18.36		
Attitude Towards the Profession5	0.67	0.55	14.17		

Table 6: Goodness-of-Fit Statistics of the Measurement Tool in Confirmatory Factor Analysis

Goodness-of-Fit Indices	Values of the Measurement Model of this Study	Reference Values	
		Good Goodness-of-Fit Value	Acceptable Goodness-of-Fit Value
X^2/df	3512.37/1529=2.29	0≤ X^2/ df≤ 2.5	3<X^2/ df≤ 5
RMSEA	0.058	0≤RMSEA≤ 0.05	0.05<RMSEA≤0.08
GFI	0.76	0.90≤GFI≤1.00	
SRMR	0.066	SRMR≤0.08	
NFI	0.91	0.90≤NFI	
NNFI	0.94	090≤NNFI	
RFI	0.90	0.90≤RFI	
CFI	0.95	0.95≤CFI	0.90≤CFI
IFI	0.95	0.95≤IFI	0.90≤IFI
Model CAIC/ Saturated CAIC	4777.38/11892.55	Model CAIC<Saturated CAIC	

Source: (Çokluk et al., 2010; Hair, 2010; Schermelleh-Engel et al., 2003).

Table 7: Second-Order Confirmatory Factor Analysis Statistics for Academic Motivation, Multiple Intelligences and Attitude towards the Profession

Dimensions and Items	Standardized Factor Loading	t-value	R2	AVE	CR
Academic Motivation				0.418	0.714
Internal Motivation	0.88	15.56	0.77		
External Motivation	0.62	11.47	0.38		
Self-Validation and Achievement	0.68	12.51	0.46		
Lack of Motivation	0.23	4.160	0.05		
Multiple Intelligences				0.319	0.757
Visual-Mathematical Intelligence	0.39	7.22	0.15		
Internal-Existential Intelligence	0.78	16.54	0.61		
Rhythmic Intelligence	0.41	7.62	0.17		
Physical Intelligence	0.61	12.14	0.38		
Social Intelligence	0.55	10.68	0.31		
Naturalistic Intelligence	0.63	12.62	0.40		
Verbal Intelligence	0.48	9.11	0.23		
Attitude Towards the Profession				0.574	0.870
Attitude Towards the Profession1	0.72	13.67	0.52		
Attitude Towards the Profession2	0.75	13.83	0.57		
Attitude Towards the Profession3	0.81	14.72	0.65		
Attitude Towards the Profession4	0.82	14.89	0.67		
Attitude Towards the Profession5	0.68	12.47	0.46		
***Academic Achievement**	1 (GPA)	-	-	-	-

** Since academic achievement is measured by a single variable (grade point average), the coefficients are not reported.*

Table 8: Goodness-of-Fit Statistics and Standard Fit Criteria of the Proposed Structural Equation Model

Goodness-of-Fit Indices	Values of the Measurement Model of this Study	Reference Values	
		Good Goodness-of-Fit Value	Acceptable Goodness-of-Fit Value
X^2/df	353.07/116=3.04	0≤ X^2/ df≤ 2.5	3<X^2/ df≤ 5
RMSEA	0.073	0≤RMSEA≤ 0.05	0.5<RMSEA≤0.08
GFI	0.90	0.90≤GFI≤1.00	
SRMR	0.06	SRMR≤0.08	
NFI	0.92	0.90≤NFI	
NNFI	0.94	0.90≤NNFI	
RFI	0.91	0.90≤RFI	
CFI	0.94	0.95≤CFI	0.90≤CFI
IFI	0.95	0.95≤IFI	0.90≤IFI
Model CAIC/ Saturated CAIC	610.25/1063.45	Model CAIC<Saturated CAIC	

Source: (Çokluk et al., 2010; Hair, 2010; Schermelleh-Engel et al., 2003).

Table 9: Descriptive Statistics on Path Analysis of the Structural Equation Model and Results of Hypothesis Testing

Hypothesis	Correlation	Coefficient	t-value	p	R^2	Conclusion
H_1	MI →AM	0.53	8.38	***	0.47	Supported
H_3	AP →AM	0.25	4.07	***		Supported
H_2	MI →AP	0.47	7.56	***	0.22	Supported
H_4	AM →AA	0.15	2.77	***	0.02	Supported

MI: Multiple Intelligences, AM: Academic Motivation, AP: Attitude towards the Profession, AA: Academic Achievement *** p≤ 0.001

mension consists of the combination of internal motivation-achievement and external motivation self-validation; thus, it includes expressions related to both internal and external motivation. The findings of the analysis are congruent with the findings of (Karagüven, 2012). It is also notable that visual and mathematical intelligence merged into a single factor, and so did internal and existential intelligence. For this reason, these dimensions were presented as visual-mathematical intelligence and internal-existential intelligence. Thus, the nine types of intelligence intended to be measured in the original scale were reduced to seven. This certainly differentiates the results of this study from previous studies in the literature. As for attitude towards the profession, a total of 5 items were clustered in one dimension. Based on the analyses performed, it can be stated that the Turkish adaptation of the scale is like the original scale. This study further demonstrated that multiple intelligences positively and significantly affect academic motivation and attitude towards the profession. In fact, Armstrong (2009) expressed that students who pursue their education using their dominant intelligence in multiple intelligences, exhibit higher levels of motivation, self-confidence and greater academic achievement. Given this, the findings of this study support the findings of previous scholarly research in the relevant literature (Moenikia & Zahed-Babelan, 2010; Piaw et al., 2014; Ryue et al., 2013). Lastly, this study shows that the attitude towards profession of the undergraduate gastronomy and culinary arts students' affects their academic motivation. It is notable that similar findings have been previously reported in the literature (Akkuzu & Akçay, 2011; Zembat et al.,

2018) and that this finding is also congruent with them.

4 Conclusion

The findings of this study support the literature that reports the effect of academic motivation on academic achievement (Amrai et al., 2011; Fortier et al., 1995; Howard et al., 2021). Nevertheless, academic motivation poorly explains academic achievement. This finding is significantly congruent with the relevant theoretical background, but it ascertains that academic motivation is not a particularly strong factor in influencing academic achievement. However, this finding is not specific to this study alone. Amrai et al. (2011) also reported that academic motivation factors have a weak effect on academic achievement.

Though academic motivation is a multifaceted structure affected by various internal and external factors, this study ascertained that multiple intelligences of undergraduate gastronomy and culinary arts students' have an impact on academic motivation. Given this, the primary implication for practitioners is that academics need to acknowledge that students possess varying sets of intelligences and then adapt their instructional methods to accommodate such differences. Given the effect of multiple intelligences on academic motivation, it is reasonable to argue that academics, when considering students' different intelligences, can develop learning activities that showcase each student's unique strengths. This would provide students with internal motivation. Adopting the principles of multiple intelligences, academics will be able to cultivate students who are motivated in their academic pursuits. The findings of this study highlighted that academic motivation is also shaped by attitude towards the profession. For this reason, improving students' attitudes towards the profession is key to increase their academic motivation. This study, thus, offers suggestions to improve students' attitudes towards the profession. First, students should be provided with environments where they can enhance their culinary experiences. Activities such as practice trips to restaurants, interactions with renowned chefs to learn from their experiences as well as more-widely available training courses for food and beverages, may not only boost students' attitudes towards the profession, but also their academic motivation. Similarly, internships offered in undergraduate programs of gastronomy and culinary arts have potential for enhancement and more internship opportunities should be made available across various sectors within the food and beverage industry. This will increase the motivation of students who exhibit different types of intelligence and contribute to their attitudes towards the profession. For example, opportunities to work in different roles such as a food stylist and photographer, a catering-provider, and a gastronomic tour guide can also bolster students' attitudes towards the undergraduate program of gastronomy and culinary art.

Another insight provided by this study is into the effect of multiple intelligences on attitude towards the profession. As Gardner (2011) stated, none of the types of intelligences in multiple intelligences is more important than another, but these intelligences intersect with each other. For example, linguistic and social intelligence contribute to improved customer and employee relationships, while mathematical intelligence helps in problem solving. Visual intelligence allows one to aesthetically present any meal, whereas physical intelligence comes into play when one prepares the meal. Lastly, while rhythmic intelligence helps develop high rhythm and coordination, existential intelligence feeds one's creativity, and naturalistic intelligence enables one to discover sustainable ways to eat. In other words, a certain level of improvement that undergraduate students of gastronomy and culinary arts will demonstrate in any area of multiple intelligences will probably result in greater attitude towards the profession and increased academic motivation. Hence, this study suggests academics to design a curriculum for students to explore all areas of intelligence and develop a lesson plan accordingly to boost students' attitudes towards the profession.

It is important that academics set difficult but achievable goals for students, so that students believe they are acting towards a purpose and are motivated for success. Also, monitoring whether they achieve the goals set and rewarding them

accordingly can greatly help increase both their motivation and academic achievement. In addition, a way to support their internal motivation would be to show them how the knowledge they acquire in the undergraduate program proves beneficial in the professional field. However, it should be noted that these strategies bring along various challenges. Examples of such challenges that academics of gastronomy and culinary arts need to take into consideration are effective use of limited resources, difficulties in evaluating student achievement, and following the curriculum.

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