

Turkish Adaptation of Achievement Motivation Measure

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Abstract

For decades, researchers have attempted to define and measure what motivates individuals to achieve. Numerous attempts have sought to measure achievement motivation by using self-report tests. The concepts of motivation and achievement motivation have a rich history of being discussed among different cultures. The purpose of this study was to adapt and report psychometric properties of Turkish-language version of the Achievement Motivation Measure. We conducted confirmatory factor analyses and correlational analysis for factor structure and measurement invariance of Achievement Motivation Measure. Participants were 336 undergraduate students and CFA findings were acceptable for the sample, $\chi^2(62) = 155.94$, $p < .001$, $\chi^2/df = 2.51$; GFI = .93, CFI = .91, SRMR = .056, and RMSEA = .067 (90% CI = .054- .081), supporting the 13-item two factors model. Moreover, the Achievement Motivation Measure had partial measurement invariance across gender. Results were consistent with the original Achievement Motivation Measure.

Keywords: achievement motivation, validation, instrument adaptation, measurement invariance

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INTRODUCTION

Motivation is a key factor to understand human nature and generally an indicator of a person's enthusiasm and willingness to do a job (Pamuk, 2007). Researchers have attached a special importance to the concept of motivation as it is viewed as correlating with cognitive, academic, and behavioral factors (Deci, Koestner, & Ryan, 1999; Eccles & Wigfield, 2002; Guay et al., 2010). Motivation, in general has been studied according to a number of dimensions, including affiliation motivation, power motivation, and competence motivation. In educational settings, researchers have focused on achievement motivation (Denzine & Brown, 2015).

Achievement motivation is "a personality disposition which compels individuals to fulfill their own internalized standards of excellence" (Lew, Allen, Papouchis, & Ritzler, 1998, p. 98). McClelland (1951, 1961) conceptualized the term as identifying three distinct needs: (1) a need for achievement (nAch), (2) a need for affiliation (nAff), and (3) a need for power (nPow). The nAch addresses a person's strong desire to accomplish goals and to reach a satisfying level of success. Second, the nAff refers to the sense of belonging and the need for affiliation. In other words, human being is a social entity, has a need to interact with each other and to be a member of a society or group. The nPow reflects one's motivation to control others and one's environment.

Studies of nAch, achievement motivation, are of interest to economists, educators, and societies across the globe (Karaman, Nelson, & Cavazos Vela, 2018). In a world, with a global race accelerating in economics, education, and business emphasis is placed on high achieving individuals who are also highly motivated. Researchers continue to study achievement motivation for a number of reasons including extent findings indicating that achievement motivation is significantly correlated with academic achievement (Bakhtiarvand, Ahmadian, Delrooz, & Farahani, 2011), study habits (Ergene, 2011), locus of control (Karaman & Watson, 2017), life satisfaction (Karaman et al., 2018; Judge, Bono, Erez, & Locke, 2005), and life goals (Ahmad & Rana, 2012).

The concepts of motivation and achievement motivation have a rich history of being discussed among different cultures. Munro (1997) stated that anthropologists attach great importance to culture and view motivation as an important element for a healthy functioning in society. Moreover, culture is an important factor that affects one's perception of achievement. In the early 1960s, achievement motivation training programs in business developed by McClelland gained popularity and were replicated by researchers in varied cultural settings (Smith, 1973). A recent study, Karaman et al. (2017) compared achievement motivation levels of individuals from Mexican, Turkish, Hispanic American, White American, and Saudi Arabian cultures. Findings indicated that U.S. participants had higher Achievement Thought and Behavior scores than participants representing other countries. One hypothesis posed was that results obtained were due to a protestant work ethic or a culture of focusing on success in the US.

Achievement motivation is a topic covered under educational psychology, and in addition to being a concept that is studied in different cultures, it is also a concept that is studied in different fields. For example, one of the areas studied is the achievement motivation of athletes (Abakay & Kuru, 2013; Arora, 2015; Can et al., 2009; Özgün, Yaşartürk, Ayhan, & Bozkuş, 2017). Athletes are a member of achievement-oriented group that each country attaches special importance. Therefore, their level of motivation is monitored by teams, coaches, psychologists and families. In a study conducted by Abakay and Kuru (2013), the relationship between achievement motivation and communication level of woman soccer players with their coaches was investigated. The researchers found that there was a positive relationship between achievement motivation and communication levels. When athletes had a good communication with the coach, their level of achievement motivation was higher. This finding showed that communication was an important factor of motivation.

There is a plethora of research showing achievement motivation was studied with the concept of academic achievement (e.g. Bakhtiarvand et al., 2011 ; Karaman, Demirci, & Özdemir, 2019). Bakhtiarvand et al. (2011) found that achievement motivation significantly moderated relationship

between learning approaches and academic success. Motivation affected the selection of approach and had an effect on success. In other words, the level of achievement motivation affected the impact of learning approaches on academic achievement.

The popularity of achievement motivation initiated measurement development. The first instrument developed to measure the concept was Thematic Apperception Test (TAT) which is a projective measure (Murray, 1938). TAT uses a series of pictures to interpret oral and written expressions of respondents. Based on the answers, achievement motivation level is interpreted. In addition, numerous self-report measures were developed and validated based on the theoretical constructs, achievement thoughts and behaviors (Smith, Karaman, Balkin, & Talwar, 2019). Examples of these measures are the Questionnaire on Current Motivation, Achievement Motivation Inventory, Achievement Motivation Profile, and the Achievement Motives Scale. In the Turkish literature, we found that two measures were developed. Semerci (2010) developed the Achievement Focused Motivation (AFM) scale. The instrument consists of 35 items under four factors (External effects, internal effects, growth of aim and self-conscious) and Cronbach Alpha reliability coefficient scores of factors changed between .66 (self-conscious) and .80 (external effects). The instrument can be used only with college of education students. However, the AFM has limitations that limit its use by researchers. First, the items were written using survey method. When researchers use this method, they need to consider validity threats. Survey method may affect measurement invariance and total variance. As a matter of fact, the total variance of scale is 37.91 means the measure explains 37.91% of achievement motivation of participants. This value is under acceptable cutoff score (Tabachnick & Fidell, 2013). Second, the self-conscious subscale has a low reliability score, but reasons and possible results were not discussed. Third, there are numerous achievement motivation theories and instruments, and the AFM neither used nor applied theories for the themes.

The second instrument available in Turkish is Achievement Motivation Scale (AMS; Saritepeci, 2018). The instrument was developed for high school students. The AMS, which was developed based on value-expectancy theory, consists of nine items under two factors (value and expectancy and belief toward the achievement). Saritepeci (2018) reported moderate reliability scores for subscales. The AMS has similar theoretical and statistical properties with the current study's Achievement Motivation Measurement (AMM). However, while the AMS measures achievement motives of high school students, the AMM measures persons who are above 18 years old.

The Achievement Motivation Measure

For decades, researchers have attempted to define and measure what motivates individuals to achieve (Smith, 2015). Numerous attempts have sought to measure achievement motivation by using self-report tests (Freund, Jaensch, & Preckel, 2017). Because of difficulties in test construction, available samples to study, and proper use of research designs only a few of these measure have been widely used (Smith, 2011, 2015). Because of this problem, outcome measures indicating achievement motivation in school settings have been limited to student grade point averages, teacher observations, and projective measures involving students' written responses to picture cues. Despite revisions of instruments designed to measure achievement motivation there remains a need to continue the development and psychometric testing of instruments to assess achievement motivation.

The Achievement Motivation Measure (Smith et al., 2019) is a recently developed instrument for measuring achievement motivation. The AMM is a 13-item instrument designed to measure achievement thoughts and behaviors based on achievement motivation theoretical concepts of McClelland and his colleagues. The original AMM- the Achievement Motivation Index, AMI- was developed by Smith in 1972 and consisted of 57 items. Response options were provided on a Likert type scale consisting of five choices *Never*, *Sometimes*, *50%*, *Usually*, and *Always*. Smith and his colleagues revised the original instrument because of practical and theoretical reasons. The original 57-item instrument lacked statistical evidences (e.g. exploratory and confirmatory factor analyses) and some items were dated. In addition, the instrument reflected two different structures based on McClelland theory. The original AMM included factors specific to ones' environmental setting, as

well as a general measure of achievement thoughts and behaviors. After consulting with a panel of experts and conducting pilot studies (see Arora, 2015; Herrero, 2014), the instrument was divided in two parts: (a) the Achievement Motivation Measure, assessing one's achievement thoughts and behaviors and (b) the Conceptual Achievement Motivation Measure assessing achievement motivation according to one's setting; work, academia, family, and community.

The AMM measures Achievement Behaviors and Achievement Thoughts. Achievement Behaviors (Smith, 2015; Smith et al., 2019) include behavior patterns consistent with high achieving individuals. These characteristics are *Moderate Risk Taking* (high achievers take carefully calculated moderate risks), *Use of Immediate Concrete Feedback to Modify Goals-* (Using feedback to modify goals or behaviors and knowing how they are doing), *Taking Personal Responsibility* (Individuals with a high need to achieve like situations where they can take personal responsibility for their success and failures), and *Researching the Environment* (Persons with high levels of achievement motivation are alert, curious, and intentional when approaching new situations).

Achievement thoughts (Smith, 2015; Smith et al., 2019) are reflected by an individual's *Need* (the desire to achieve something), *Action* (thinking about and taking responsibility to achieve excellence), *Hope of Success* (imagining success before initiating a task) and *Fear of Failure* (Worry about failing). Additional achievement thoughts include *Feelings of Success* (good feelings and thoughts after reaching goals), *Feelings Failure* (bad feelings and thoughts after failure), *World Obstacles* (assessing world events or obstacles that interfere with success), *Personal Obstacles* (assessing personal obstacles or traits that interfere with success), and *Help* (assessing where to obtain help in order to achieve success).

The AMM instrument was validated in accordance with the American Educational Research Association (AERA), American Psychological Association (APA), and National Council on Measurement in Education (NCME; 2014) standards for educational and psychological testing. An initial study on instrument validation, Smith et al. (2019) surveyed undergraduate and graduate students producing findings of reliability estimate of .83. In addition the AMM significantly predicted level of locus of control among participants. In a second study, researchers collected data from a diverse group of undergraduate students, including International and Hispanic American. Findings included a reliability estimate of .84.

The current study examined the factorial validity and measurement invariance of the 13-item Turkish version of the AMM. The researchers hypothesize this instrument will provide opportunities for Turkish researchers and practitioners to accurately measure the level of achievement motivation of individuals in a variety of settings. The following research questions were addressed in the study:

1. Are the AMM Turkish (AMM-TR) version scores valid and reliable?
2. Does the AMM-TR version have factorial invariance across gender?

METHOD

Participants

Participants included 336 first-year counseling undergraduate students enrolled at a university in the Eastern Anatolia region of Turkey. There were more women ($n=217$, 64.6%) than men ($n=119$, 35.6%) in the study. The mean age of the participants was 20.94 years ($SD = 2.69$; range, 17-35 years). In terms of perceptions level of motivation, 104 participants (31%) reported that they had high motivation, 159 participants (47.3%) had moderate, and 73 participants (21.7%) had low perception level of motivation.

Measures

The Achievement Motivation Measure. The AMM (Smith et al., 2019) was developed from the Achievement Motivation Inventory (AMI; Smith, 1972). The AMM consists of 13 items under two factors based on the Achievement Motivation theoretical principles developed by Atkinson and McClelland (1948). The two factors measure the achievement thoughts and behaviors of high achieving individuals as described by McClelland (1961). The AMM uses a 5-point Likert-type response format with values ranging from 0 (*never*) to 4 (*always*). The minimum scores that one can obtain is 0 and the maximum score is 52 (Smith et al., 2019). Higher scores refer to a high level of achievement motivation and lower scores refer to low levels of achievement motivation. The 13-item scale includes items such as “I can keep my mind on a task for a long period of time” and “I like to undertake projects that involve some risk.” The AMM takes approximately five minutes to administer.

To validate the AMM instrument, researchers (Smith et al., 2019) conducted two analyses using different data sets. An Exploratory Factor Analysis (EFA) using principal component analysis with a promax rotation was conducted on the first data set including 303 students enrolled in graduate and undergraduate courses in a university setting. A Confirmatory Factor Analysis (CFA) was used to evaluate the model in the second analysis. The CFA was conducted using a new data set that included 329 participants. The results of the CFA indicated a good fit.

To establish further evidence, Smith et al. (2019) used Cronbach’s Alphas to assess estimates of reliability for the normative sample. The results indicated that reliability coefficients were moderate for Achievement Thoughts (.80) and small for Achievement Behavior (.60). The overall alpha coefficient for the AMM was .83.

Procedure

The university institutional review board approved the current study. Forward and backward methods were used during the translation process of the AMM. Four independent forward translations of the original inventory were obtained from four counselor educators who completed their graduate degrees in the U.S. The four independent translated documents were compared, analyzed, before the completion of the translated survey. The researchers consulted with a Turkish language and literature expert for grammar and language proficiency. The final version of AMM was reverse translated by an expert who held a BA degree in English language and literature and worked as an English teacher in Turkey for 10 years. The researchers collected basic demographic information from participants including: age, sex, number of siblings, and educational background.

Data Analysis

Statistical power analysis. We conducted a power analysis to identify a sample size for detecting model fit using Stevens’ (2009) criteria, $n/p \geq 10$. With this formula in mind and the measure consisting of 13 items a sample size of at least 130 participants was required. Given our sample of 336, we considered our sample size to be sufficient for making statistical inferences about a model fit.

Preliminary analysis. After transferring data into a Statistical Package for the Social Sciences (SPSS; IBM Corporation, 2013) file, we followed two steps in order to clean the data. First we examined missing data. Next we replaced missing values within the data by using the SPSS series mean function. Researchers examined the data and removed two cases from the data set due to missing instrument responses. A descriptive statistic was run to find the percentage of missing values. The results indicated that the percentage of missing values were .002%. Based on this finding, we replaced missing values with series mean. Before conducting analysis, researchers evaluated the assumption of normality using the Kolmogorov-Smirnov test and was met ($p > .05$).

Primary analysis. Researchers conducted a CFA using AMOS version 23. We decided to start with CFA because the instrument being tested had a theoretical base and was validated on the basis of prior work. As a result, the two-factor model was created based on Smith et al. (2019) research. We interpreted the chi square statistic (χ^2) and *p*-values, as well as goodness of fit index (GFI), comparative fit index (CFI), standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA) metrics of model fit. When inspecting these values, we used standards in which an acceptable model fit (Dimitrov, 2012) is represented in values for the χ^2 ($p > .05$), GFI $> .90$, CFI $> .90$, SRMR $< .08$, and RMSEA $< .08$ [90% CI]. Reliability estimates in the normative sample were evaluated using Cronbach's alpha (α) to assess internal consistency. The scale means, standard deviations, and reliability coefficients for the AMM are presented in Table 1.

Table 1. Means, Standard Deviations, and Internal Consistencies of the Two Factors across Samples

Study Sample	ATh	ABh
Current Study: Turkish undergraduate students ($n=336$)		
M	2.75	2.39
SD	.97	1.12
α	.80	.60
Smith et al. (2019): EFA participants ($n=303$)		
M	2.95	2.19
SD	.90	1.04
α	.77	.60
Smith et al. (2019): CFA participants ($n=329$)		
M	3.02	2.45
SD	.91	1.04
α	.80	.60
Effect size: 1 vs. 2		
Cohen's <i>d</i>	-.21	.19
Effect size: 1 vs. 3		
Cohen's <i>d</i>	-.29	-.05

Note. ATh= Achievement Thoughts, ABh= Achievement Behaviors.

RESULTS

We performed a CFA to demonstrate validity evidence based on internal structure (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014). The initial model included the original two-factor model with 13 items (Smith et al., 2019). The results indicated that the χ^2 was significant for the hypothesized model, $\chi^2(64) = 190.90$ $p < .001$, $\chi^2/df = 2.98$. The fit indices indicated a mediocre fit for the data, GFI = .91, CFI = .88, SRMR = .060, and RMSEA = .077 (90% CI = .064-.090). Hence, we examined modification indices (MIs) to identify a better model fit. Review of MIs showed that there was a high error covariance between item 8 (i.e. In most projects I would rather take personal responsibility for completion than be only a contributor) and item 9 (i.e. I like to undertake projects that involve some risk). It was found that these two items were under the same latent variable (Achievement Behaviors) [see Figure 1] and emphasized attributions towards projects.

The error covariance between items 7 and 8 were correlated to improve the model. We conducted a rerun the model with results indicating that the modified model improved dramatically $\chi^2(63) = 171.35$, $p < .001$, $\chi^2/df = 2.72$; GFI = .92, CFI = .90, SRMR = .057, and RMSEA = .072 (90% CI = .059-.085). This model has an acceptable model fit when compared to the initial model. Authors reviewed the MI again. Modification indices suggested adding an error covariance between items 2 and 3 to improve the model. An examination of item 2 (i.e., I have a strong desire to be a success in the things I set out to do) and item 3 (i.e., When proceeding on a difficult task, I think of all the

resources that may be available to me to successfully complete the task) showed that these two items were under the same latent variable (Achievement Thoughts) and emphasized completion and success of plans. After the modification and the rerun of the model, findings indicated that the model with this modification improved the model and had an acceptable fit, $\chi^2(62) = 155.94, p < .001, \chi^2/df = 2.51$; GFI = .93, CFI = .91, SRMR = .056, and RMSEA = .067 (90% CI = .054- .081). There were several additional modification suggestions, however we did not make further change since there would not be significant improvements in the model.

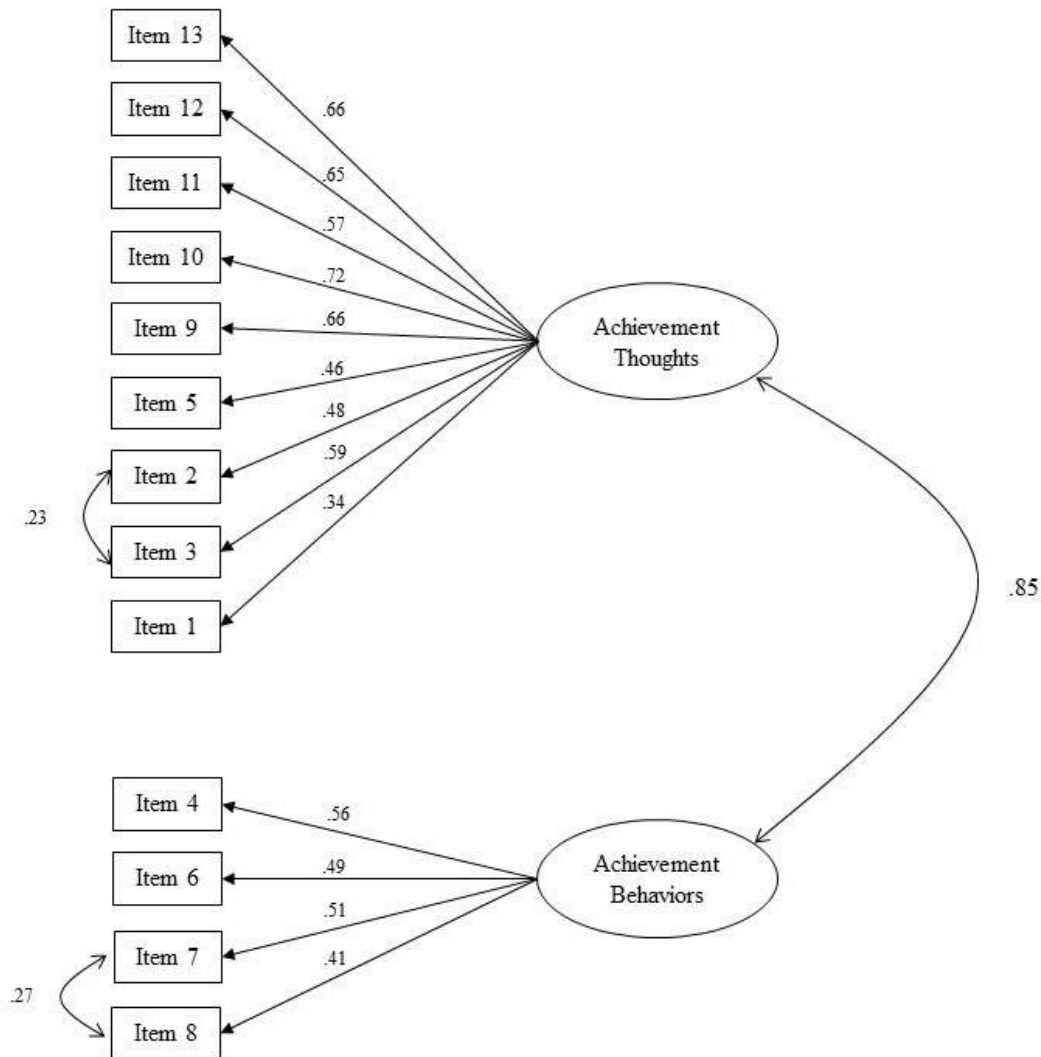


Figure 1. The final confirmatory factor analysis model of Achievement Motivation Measure-Turkish form (AMM-TR). The standardized parameter estimates for the AMM-TR are listed. Error covariances were added between Items 2 and 3 and Items 7 and 8. Rectangles indicate the 13 items on the AMM-TR, and ovals represent the 2 latent factors of subscales.

A correlational analysis between subscale scores was run to address convergent validity. There was a statistically significant and positive relationship ($r = .65, p < .01$) between achievement thoughts and achievement behaviors. Based on this analysis, and as expected, higher achievement thought scores correlated with higher achievement behavior scores.

Additional Validity Evidence Regarding Relationships with Criteria

Following AERA et al. (2014) Standard 1.20, we calculated effect sizes to compare the mean scores of the AMM subscales between the current study's sample and Smith et al. (2019) sample. Smith's sample included two different data sets. The first data set included 303 undergraduate and graduate students for an EFA study, while the second data included 329 domestic and international undergraduate students for a CFA study. Table 1 provides descriptive data including means and standard deviations of each of the subscales, and calculated effect size.

Cohen (1992) reported effect sizes (d) as small (.20), medium (.50), and large (.80). Effect size differences were noted between Turkish undergraduate students and U.S. students. For example, Turkish undergraduate students had lower levels of achievement thoughts than U.S. undergraduate and graduate students group ($d = -.29$). Next, there was effect size differences between Turkish undergraduate students and U.S. graduate and undergraduate students ($d = -.21$). Specifically, Turkish undergraduate students had lower levels of achievement thoughts. In terms of achievement behaviors, Turkish students had higher levels than U.S. undergraduate students and lower levels than U.S. undergraduate and graduate group ($d = .19$ and $d = -.05$, respectively). However, values did not meet a small effect size cutoff.

Measurement Invariance

We examined the measurement invariance of the two-factor model across gender. There are two commonly used methods, chi-square difference test ($\Delta\chi^2$) and CFI difference test (ΔCFI), that are well documented in the literature (e.g. Byrne, 2010; Dimitrov, 2010; Sulik et al., 2010) to test measurement invariance. The chi-square difference test is the classical approach testing the difference between the χ^2 values for the configural and other models (Byrne, 2010; Jöreskog, 1971). The $\Delta\chi^2$ test should not be statistically significant at a pre-specified alpha level (e.g., .05) across groups for measurement invariance. Over the past decades, it has been well-documented that χ^2 test is sensitive to sample size (Cheung & Rensvold, 2002; Dimitrov, 2010). Cheung and Rensvold (2002) recommended using the CFI difference since it was not affected by measurement accuracy in the overall model (Dimitrov, 2010). Cheung and Rensvold (2002) suggested using .010 cutoff score for ΔCFI test. Following the previous studies (e.g., Cicero, Neis, Klaunig, & Trask, 2016; Dimitrov, 2010) and due to limitations of $\Delta\chi^2$ test, ΔCFI test was used in the study.

We specified three models, configural model (factor loadings and intercepts vary between groups), metric model (factor loading are equal between groups but intercepts vary), and scalar model (both intercepts and loadings are equal between groups), to test the measurement invariance. The configural model fit the data well [$\chi^2(160) = 280.45$, RMSEA = .047 (90% CI= .038- .057), CFI= .893, TLI= .879], as did the metric model [$\chi^2(172) = 292.53$, RMSEA = .046 (90% CI= .038- .057), CFI= .893, TLI= .887]. The ΔCFI was smaller than cutoff score (.01), suggesting the metric model fit as well as configural model. Next, we examined the scalar invariance. This model had an acceptable fit, $\chi^2(186) = 327.36$, RMSEA = .048 (90% CI= .039- .056), CFI= .875, TLI= .878, but the ΔCFI test value (-.018) was an indicator of lack of invariance. After reviewing MIs, we found that item 5 and item 8 had greater and significant values. Following the recommendation to free one parameter at a time, intercept for item 5 was allowed to have different estimates across the gender. However, the resulting ΔCFI had a value over .01. After freeing the intercepts for both items, modification indices produced a model with acceptable fit, $\chi^2(184) = 310.99$, RMSEA = .045 (90% CI= .037- .054), CFI= .888, TLI= .889. The ΔCFI test had also a better result (-.005). Based on these results, we can conclude that the AMM scale has partial measurement invariance.

DISCUSSION

The goal of this study was to examine the structure and reliability estimates of scores on the Turkish version of the AMM with a sample of Turkish college students. Globalization provides

researchers and practitioners' opportunities to transfer and integrate Eastern and Western philosophies and approaches to different cultures. In this respect, early and recent studies (Karaman et al., 2017; Freund et al., 2017; Smith, 1973) indicated that the concept of achievement motivation is of interest and has been studied in different cultures. In addition, several self-report measures of achievement motivation were developed beginning in the early 1970s. However, problems of design, sampling, and analytics have prevented widespread use of these instruments (Smith et al., 2019). An important distinction between the AMM and previously developed and validated achievement motivation instruments is its theoretical approach and the validation process utilized.

The current study of the Turkish translated version of the AMM found the results of the CFA to be acceptable for the sample and supported the 13-item two factors model. Our results were consistent with the final model of the AMM (Smith et al., 2019). Contrary to instruments that have been translated to other languages often resulting in different factor structures than the original measure (see Cokley, 2015; Deniz, Özer, & Işık, 2013), this study produced a factor structure that did not change significantly. However, there were modification suggestions between items, including 2 and 3, and 7 and 8. Item 2 (i.e. I have a strong desire to be a success in the things I set out to do) and item 3 (i.e. When proceeding on a difficult task, I think of all the resources that may be available to me to successfully complete the task) were both from the Achievement Thoughts factor, and focused on completing a task successfully.

Another change involved item 7 (i.e. in most projects I would rather take personal responsibility for completion than be only a contributor) and item 8 (i.e. I like to undertake projects that involve some risk). The two items are listed under the Achievement Behavior factor measuring taking responsibility for projects. In future studies, we may think to revise or rewrite these covariating items. When instruments are validated in different cultures with a different language, it is common that measures may have different subscales (Matsumoto, 2000). However, in this study, the AMM-TR version confirmed 2 factor model and did not have a different factor structure than the original AMM, thus presenting evidence of validity.

Results of the measurement invariance in gender supported the hypothesis that the AMM-TR version would be invariant across men and women. Perhaps comparisons and interpretations based on gender would be partially meaningful. The literature supports the notion that it is hard to reach the goal of having full measurement invariance in practice (Carr et al., 2017; Dimitrov, 2010; Milfont & Fischer, 2010). The reason that we investigated invariance in gender was because of the changing nature of factors as achievement and motivation based on gender in various cultures (Karaman et al., 2017).

Different than other achievement motivation instruments in Turkish (e.g. Saritepeci, 2018; Semerci, 2010), the AMM can be used with persons above 18 years old which provides a wide range of uses for researchers, teachers and practitioners. The instrument had high reliability scores except achievement behavior subscale. In addition, different than other instruments it has partial measurement invariance for gender and other language versions (Arabic, English and Spanish; Karaman et al., 2017).

The AMM-TR version has practical and theoretical implications for researchers, practitioners, and educational institutions. The AMM-TR provides a quick, modern, and global measure to assess individual differences based upon one's achievement thoughts and behaviors. The AMM-TR can be used with individuals and in groups. Mental health practitioners' can use the AMM-TR as an instrument with clients, researchers can collect large group data using this brief measure, and institutions (e.g. university counseling and career centers) and business settings might find the AMM-TR useful in employee selection, promotion, and career planning.

This study has limitations. The sample consisted of first year counseling undergraduate students. This may have an effect on measurement invariance since the sample was homogeneous in terms of class levels. Future studies should include participants from different class levels and other

settings (e.g. business). Almost 65% of participants were women, allowing for a threat to measurement invariance. In addition, the achievement behavior subscale had a low reliability score (.60). This was a limitation both for Smith et al.'s study (2019) and the current investigation.

In conclusion, Turkey is a developing country with a growing population of young people. In the past 10 years, more than 20 new state universities were established to accommodate for the educational needs of an increased population base. It is recommended that researchers who work in these institutions and school counselors who guide students attending public schools assess their students' achievement motivation. Perhaps programs will be developed to enhance students' level of achievement motivation once this concept has been accurately assessed. Replications of this study involving participants from a variety of cultures are recommended.

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