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*Corresponding author: Gözde Ersöz,
School of Physical Education and Sports,
Namik Kemal University, Namik Kemal
Mahallesi, Kampüs Caddesi, Beden
Eğitimi ve Spor Yüksekokulu, Tekirdağ
59000, Turkey
E-mail: gozde0007@gmail.com

Reviewing editor:
Sammy King Fai Hui, The Education
University of Hong Kong, Hong Kong

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EDUCATIONAL ASSESSMENT & EVALUATION | RESEARCH ARTICLE

Reliability and validity of goal orientation in exercise measure (GOEM)—Turkish version

Gözde Ersöz^{1*}, Mine Müftüler², Tennur Yerlisu Lapa³ and Adile Tümer⁴

Abstract: The aim of this study was to examine validity and reliability of the Turkish version of the Goal Orientation in Exercise Measure (GOEM). There were 408 participants who were regularly exercising and their age ranged from 17 to 61 years old. The psychometric characteristics of the scale were investigated using exploratory factor analysis (EFA), confirmatory factor analysis (CFA), convergent validity, internal consistency, and test–retest. EFA results showed that GOEM had a two-factor structure (ego and task orientation). CFA confirmed this structure ($\chi^2/df = 1.83$; AGFI = .95; GFI = .97; CFI = .98; NFI = .97; TLI = .98; RMSEA = .045, SRMR = .049). Cronbach's Alpha values were found as .90 for ego orientation and .87 for task orientation. Test–retest coefficient for GOEM was .88 for ego orientation and .87 for task orientation. Furthermore, correlations between the goal orientations and behavioral regulations served to provide initial evidence for the convergent validity of the measure. These results indicated that GOEM is a reliable and valid scale in Turkish context.

Subjects: Sports and Leisure; Social Sciences; Behavioral Sciences; Health and Social Care

Keywords: goal orientations; achievement goal theory; exercise motivation; confirmatory factor analysis (CFA)

ABOUT THE AUTHORS

Gözde Ersoz is an assistant professor in School of Physical Education and Sports Teaching in Namik Kemal University in Turkey. Her main research interests are leisure-time physical activity participation, exercise psychology, and theory-based interventions. She is also currently interested in basketball, swimming, and fitness.

Mine Müftüler is an assistant professor in Faculty of Sport Sciences in Muğla Sıtkı Koçman University in Turkey. Her main research interests are leisure-time physical activity participation, leisure education, and theory-based interventions. She is also currently interested in yoga, hiking, camping, and rock climbing.

Tennur Yerlisu Lapa is an associate professor in School of Physical Education and Sports in Akdeniz University in Turkey. Her main areas of research are participation, satisfaction, constraints, negotiation, and perceived freedom in leisure.

Adile Tümer is an assistant professor in Faculty of Health Sciences in Muğla Sıtkı Koçman University in Turkey. Her main research interests are healthy lifestyle, health behavior models, health promotion behaviors, behavior of physical activity, breast cancer early diagnosis behavior.

PUBLIC INTEREST STATEMENT

Even though the human body is designed to move and attend physical activities, exercises do not have a place within the routine struggles of a mediocre life style and when the human body continues to live for a long time without performing the necessary physical activities it should do, some of the functional abilities it possesses diminish and functional inadequacies cause many illnesses. Researches indicated that the regular exercise positively effects our physical and psychological health and health-related quality of life. Therefore, it is important for all to make exercise a regular part of our daily life. Motivation plays an important role for regular exercise involvement. In this study, we have adapted a measurement to determine how motivation plays role in exercise for Turkish people.



Gözde Ersoz

1. Introduction

Physical, psychological, and social benefits of exercise are well documented (Haskell et al., 2007; Kanamori, Takamiya, & Inoue, 2015). However, despite the benefits of exercise, only some individuals exhibit motivation to exert the effort in physical activity, while others fail to incorporate exercise into their daily lives (Department of Health & Human Services [USDHHS], 2008). Recent evidence has shown that motivation is an important determinant of exercise behavior to initiate, sustain, or terminate exercise involvement (Brunet & Sabiston, 2011; Hagger & Chatzisarantis, 2007; Ingledew & Markland, 2008). One approach that may be useful in this regard is Achievement Goal Theory (AGT: Nicholls, 1984, 1989), which assumes that goal orientations play an important role in exercise dependence.

AGT proposes that differences in how individuals identify success or evaluate their competence influence their motivational processes and indicate that individuals can orient their motivation in two goals (i.e. ego and task). These motivational orientations are based on the criteria by which they judge their competence and determine the success of their participation in a certain activity in a context of perception. Individuals who are ego oriented are focused on the result that comes from their involvement, and perceive that competence results from the comparison with others. Those who are task oriented are focused on self-referenced mastery, or learning how to do the task and improving their personal skills (Nicholls, 1984, 1989). Furthermore, variations in these two goal orientations, or tendencies, are thought to be linked to different cognitive, affective, and behavioral outcomes.

AGT has been widely known as contributing to insight into individuals' achievement motivation in educational domains (Anderman & Patrick, 2012), sports domains (Kristiansen, Halvari, & Roberts, 2012), and exercise domains (Klain et al., 2014; Petherick & Markland, 2008). In general, research findings suggest that task orientations are associated with positive outcomes such as intrinsic motivation (Nicholls, 1989) and persistence in the face of challenging tasks (Dweck & Leggett, 1988). Ego orientations, on the other hand, have been linked to more negative outcomes although this relationship is not as clear as the positive outcomes related to task orientations. Ego orientations are focused on demonstrating as little effort as possible in social comparisons to display high levels of ability (Biddle & Goudas, 1997).

A number of scales have been developed to assess reasons for participating in sports from AGT perspective such as the Task and Ego Orientation in Sport Questionnaire (TEOSQ: Duda & Nicholls, 1992) and Perceptions of Success Questionnaire (POSQ: Roberts, Treasure, & Balague, 1998). TEOSQ is the most widely used questionnaire for evaluating goal orientations which showed good construct validity, as well as internal consistency reliability in different populations, including various sports, competitive levels, and nationalities. Several researchers have evaluated goal orientations through young recreational (Biddle & Goudas, 1996) and adult exercise participants (Gill, Williams, Dowd, Beaudoin, & Martin, 1996).

However, it is significant to develop a theoretical instrument from which such goals are assessed in an exercise setting. Firstly, Goal Orientation in Exercise Scale (GOES: Kilpatrick, Bartholomew, & Riemer, 2003) was developed to assess goal perspectives for exercise participation. GOES was adapted from the widely used TEOSQ. While GOES is commendable, it has some inconsistencies in presenting the analyses. Although Kilpatrick et al. (2003) stated their model as a good fit by non-significant covariance matrices, the construct factorial validity of GOES still remains unclear. These are important issues to address as advances in researchers' current understanding of exercise motivation should derive from a sound theoretical perspective.

More recently, Petherick and Markland (2008) developed the Goal Orientation in Exercise Measure (GOEM) that has been shown to have good factorial validity. The GOEM is comprised of 10 items and measures 2 aspects of the exercise motivations (ego orientation and task orientation). Several studies have examined the psychometric properties of GOEM and it was indicated that task goal

orientation was positively related to intrinsic, identified, and introjected behavioral regulations (Ntoumanis, 2001; Petherick & Weigand, 2002). Furthermore, ego goal orientation was positively related to introjected and external regulations (Petherick & Markland, 2008).

Cross-cultural reliability and validity across different cultures for GOEM have been supported (Cid, Leitão, & Alves, 2012; Dolenc, 2015). Cid et al. (2012) in a sample of 318 regular exercise participants from Portuguese found that GOEM had good psychometric qualities including acceptable factorial validity and strong internal consistency. Additionally, 10-item model had a reasonable fit to the data and were consistent with the structure hypothesized in the original scale developed by Petherick and Markland (2008). In another study, Dolenc (2015) found that Slovenian version of GOEM confirmed the original two-factor structure, and Cronbach's alpha reliability coefficients revealed a good internal consistency for both task and ego orientations.

Most of the research on goal orientations for exercise participation has been conducted with English-speaking populations. In order to extend the applicability of theories and models across cultures and nations, translation of relevant measurements to other languages is necessary. Further accurate assessment methods that are associated with exercise motivation can be developed. This logically leads to research identifying factors associated with exercise and interventions to increase physical activity. Therefore, it is important to identify valid and reliable ways to assess goal orientations in exercise. Due to lack of a valid and reliable instrument for measuring goals orientations in Turkish exercise participants, the purpose of this study was to investigate the psychometric properties of the Turkish version of GOEM.

2. Methods

2.1. Participants

The sample consisted of 408 participants (sample 1) who were regularly exercising at gyms belonging to municipalities, universities, and private establishments as a leisure activity. Exercisers' ages were between 17 and 61 years old. They were selected purposefully and voluntarily participated in this study. Among the participants, 201 were female ($M_{\text{age}} = 28.04 \pm 9.84$) and 207 were male ($M_{\text{age}} = 27.29 \pm 9.54$). Amongst the thirteen different activity types identified by participants, the four most common activities reported as weight-lifting ($n = 111$), walking ($n = 71$), running ($n = 70$), and pilates ($n = 54$). Average exercise frequency of participants was calculated as 3.92 ± 1.30 days in a week. Self-reports on the length of exercise per exercise session ranged from 20 min to more than 2 h. The participants' exercise sessions generally ranged from 46 to 90 min weekly. Additionally, test-retest reliability of measure was tested with another sample (sample 2). The test-retest sample included 80 participants ages were between 17 and 39 ($n_{\text{male}} = 40$; $M_{\text{age}} = 20.92 \pm 3.58$ and $n_{\text{female}} = 40$; $M_{\text{age}} = 20.55 \pm 2.57$) and they were recruited from gymnasiums, clubs, and leisure centers.

2.2. Instruments

Demographic data were provided on gender, age, exercise type, exercise frequency, and the length of exercise. In addition, the Goal Orientations in Exercise Measure (GOEM) scale was used to assess goal orientations in exercise and the Behavioural Regulations in Exercise Questionnaire-2 (BREQ-2) was used to assess behavioral regulations in exercise.

2.2.1 Goal orientations in exercise measure (GOEM)

Petherick and Markland (2008) developed a new goal orientation scale called GOEM. This scale assesses individual differences in the ways people construe success. The GOEM has 10 items, in which participants respond to how much they agree with the statements provided. Specifically, GOEM evaluates an individual's proneness toward task goal orientation (GOEM-task; e.g. "I exercise to the best of my ability") or ego goal orientation (GOEM-ego; e.g. "I know that I am more capable than other exercisers"). Responses are on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores on the task or ego goal orientation subscales reflect a higher

tendency to engage in task or ego goal orientation. Evidence of internal consistency has been demonstrated with the five task items ($\alpha = .78$) and the five ego items ($\alpha = .88$).

2.2.2 *The behavioral regulations in exercise questionnaire-2 (BREQ-2)*

BREQ-2 developed by Markland and Tobin (2004) was used in order to determine motivational orientation within the scope of self-determination of individuals who participate in exercise. It consists of 19 items and has five subscales. These are: external regulation (e.g. I exercise because others say I should), introjected regulation (e.g. I feel guilty when I don't exercise), identified regulation (e.g. I value the benefits of exercise), intrinsic regulation (e.g. I exercise because it's fun), and amotivation (e.g. I don't see why I should have to exercise) subscales. The reliability and validity evidences of BREQ-2 for Turkish university students were obtained in a study carried out by Ersöz, Aşçı, and Altıparmak (2012). The Turkish version of BREQ-2 resulted in four subscales, which are intrinsic regulation, introjected regulation, external regulation, and amotivation. In the Turkish version of BREQ-2, each subscale contains four items except intrinsic regulation, which has seven items (Ersöz et al., 2012). BREQ-2 is a five-point Likert-type scale and the ratings range from 0 (not true for me) to 4 (very true for me). Cronbach's alpha coefficients of subscales for this sample ranged between .68 and .80.

2.3. *Procedures*

The recommendations made by Beaton, Bombardier, Guillemin, and Ferraz (2000) were followed to establish the cultural equivalence of the original English version of the GOEM. After permission for adaptation of the "Goal Orientations in Exercise Measure" received from Petherick and Markland, it was translated into Turkish by three researchers and a leading expert who completed university education in English. The form translated into Turkish was evaluated by two English grammar experts and an academic whose English level is sufficient for academic work in sport psychology. Turkish form was translated back into English by three grammar experts. In the next stage, all translations and the original questionnaire were given to a expert in order to consolidate all the versions of the questionnaire and achieve equivalence between the original and target versions.

For data collection, the managers of gyms belonging to public, municipalities, universities, and private establishments as leisure sport activity were firstly informed about the purpose of the study and permission for approaching the participants was secured. After that, the respondents were approached by researchers around reception area, before exercise session. All participants were briefly informed about the purpose of the study and signed an informed consent. Completing the scale took approximately 10 min for each person.

2.4. *Statistical analysis*

The IBM SPSS and AMOS version 22.0 (IBM corp, Armonk, New York) were used to analyze the data. In accordance with Bryne's (2010) recommendations, data analyses were performed in three stages: (1) Exploratory factor analysis (EFA), (2) Confirmatory factor analysis (CFA), and (3) reliability analysis. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to determine the construct validity and Pearson product-moment correlation coefficient tests were used to evaluate the convergent validity. Internal consistency and test-retest reliability were used for assessing reliability.

2.4.1. *Validity*

2.4.1.1. *Exploratory factor analysis.* To verify the validity of the construct, the factorial design of the GOEM was analyzed using both exploratory and confirmatory factor analysis (EFA and CFA). EFA was performed to investigate the factor structure of the scale by Principal components analysis (PCA) with varimax rotation (Tabachnick & Fidell, 2013). It was accepted as the criteria that factor loadings should be at least .35 (Hair, Black, Babin, Anderson, & Tatham, 2006).

2.4.1.2. Confirmatory factor analysis. Following EFA, CFA was conducted to verify the proposed structure of the GOEM. The multivariate kurtosis index (Mardia, 1985) indicates that the joint distributions of the sets of items depart significantly from normality. In order to determine whether the measure had reasonable fit into the hypothesized model, goodness of fit statistics was used. Fit index used to test Model adaptation was calculated by dividing the chi-square (χ^2) value by degrees of freedom (χ^2/df). Then, the following commonly used fit indexes were used; Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Normal Fit Index (NFI), Tucker Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).

2.4.2. Reliability

Internal consistency and test-retest reliability analyses were used for assessing reliability. Internal consistency refers to the extent to which items of the scale measure the same construct (i.e. homogeneity of the scale), and it was assessed in our study by Cronbach's α (should be $>.70$). To evaluate the repeatability of the GOEM, Pearson product-moment correlation coefficient was used to assess test-retest reliability at two-week intervals.

3. Results

This section includes the findings of exploratory and confirmatory factor analyses, convergent validity and reliability analyses, respectively. Statistical significance was accepted at the $p < .05$ level of probability for all analyses.

3.1. Validity

3.1.1. Exploratory factor analysis

Firstly, exploratory factor analysis was implemented in order to test the construct validity. $KMO = .88$, $\chi^2 = 2308.61$, $df = 45$, $p = .000$ were determined in Kaiser-Meyer-Olkin and Bartlett's test of sphericity which were performed to determine the acceptability of data for factor analysis. Result of KMO over $.60$ and statistical significance of Bartlett's test of sphericity showed that the data were acceptable for exploratory factor analysis (Ferguson & Cox, 1993). According to the results, it was determined that scale value accumulated to 2 factors with Eigenvalue over 1.0 and 69.93% of the total variance was explained. First factor (ego orientation) consisted of 5 items and explained 35.51% of the total variance, second factor (task orientation) consisted of 5 items and explained 34.42% of the total variance. The factor loadings varied between $.70$ and $.87$ (Hair, Anderson, Tatham, & Black, 1998). The scale obtained with 10 items had a valid structure with the same item number of the original scale. Factor loadings and the total explained variance ratios were given in Table 1.

3.1.2. Confirmatory factor analysis

The CFA determined whether the hypothesized structure provides a good fit to the data, in other words, that a relationship between the observed variables and their underlying latent, or unobserved constructs existed (Child, 1990). CFA is a type of structural equation modeling (SEM) that deals specifically with measurement models that is, the relationships between observed measures or indicators (e.g. test items, test scores, behavioral observations ratings) and latent variables or factors (Brown, 2015).

CFA was accepted as the natural extension of the EFA model (Lee, 2007). CFA was used for testing structure validity of factors obtained via GOEM. According to the results of the CFA, the standardized factor loadings of items for GOEM varied between $.63$ and $.86$ (Figure 1).

The fit indexes ($\chi^2 = 62.48$, $df = 34$, $\chi^2/df = 1.83$; AGFI = $.95$; GFI = $.97$; CFI = $.98$; NFI = $.97$; TLI = $.98$; RMSEA = $.045$ ve SRMR = $.049$) showed perfect fit. It can be said that the obtained model revealed that factors were confirmed by values (Table 2).

Table 1. Exploratory factor analysis results for GOEM

Scale items	Factor loading	Eigenvalue	% of variance	Cumulative %
<i>Factor 1: Ego orientation</i>				
Item 5. I can show other exercisers that I'm better than everyone else	.870	3.551	35.507	35.507
Item 10. I can prove to others that I'm the best	.866			
Item 8. I know that I am more capable than other exercisers	.863			
Item 7. I prove to myself that I am the only one who can do a certain exercise task	.847			
Item 2. Other exercisers don't do as well as me	.731			
<i>Factor 2: Task orientation</i>				
Item 4. I achieve the exercise goal I set for myself	.873	3.442	34.420	69.927
Item 3. I make progress	.863			
Item 6. I feel like I've improved	.849			
Item 1. I exercise to the best of my ability	.823			
Item 9. I exercise at a level that reflects personal improvement	.701			

Figure 1. Confirmatory factor analysis results for the GOEM.

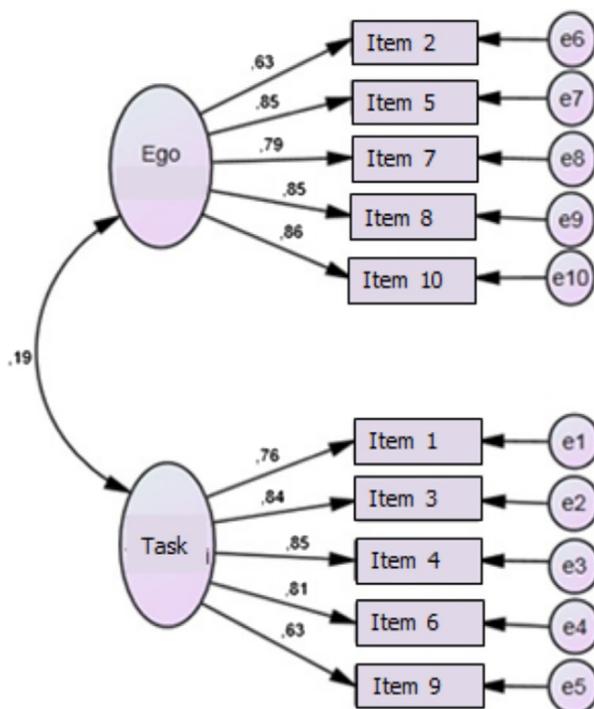


Table 2. Evaluation of the CFA

Fit indexes	Good fit	Sample statistic
χ^2/df	$0 \leq \chi^2/df \leq 2$	62.48/34 = 1.83
AGFI	$.90 \leq AGFI \leq 1.00$.95
GFI	$.95 \leq GFI \leq 1.00$.97
CFI	$.95 \leq CFI \leq 1.00$.98
NFI	$.95 \leq NFI \leq 1.00$.97
TLI	$.95 \leq TLI \leq 1.00$.98
RMSEA	$.00 \leq RMSEA \leq .05$.045
SRMR	$.00 \leq SRMR \leq .05$.049

3.1.3. Convergent validity

The relationship between GOEM and BREQ-2 was calculated with Pearson product-moment correlation coefficient (Table 3) in order to determine convergent validity of GOEM. As a result of the analysis, ego orientation subscale showed a positive linear relationship with intrinsic regulation ($r = .102, p < .05$), introjected regulation ($r = .134, p < .05$), external regulation ($r = .157, p < .05$), and amotivation ($r = .109, p < .05$). On the other hand, task orientation subscale had positive linear relationship with introjected regulation ($r = .174, p < .05$) and intrinsic regulation ($r = .345, p < .05$), while it had negative linear relationship with external regulation ($r = -.179, p < .05$) and amotivation ($r = -.355, p < .05$).

3.2. Reliability

Table 4 shows the Cronbach’s Alpha reliability coefficients which gave the internal consistency of scale for two factors obtained after the factor analysis. Cronbach’s Alpha values were found as .90 for ego orientation and .87 for task orientation. These values indicated that the internal consistency of scale was acceptable.

The test–retest reliability method was used to determine the reliability of GOEM. The time interval between the test–retest was 2 weeks, and the findings are presented in Table 5. Pearson product-moment correlations were found as .88 and .87 where both relationships were significant and positive ($p < .01$). Results indicated that GOEM was a reliable measure in Turkish sample.

Table 3. Pearson correlation coefficients and 95% confidence intervals (95% CI) among subscales of BREQ-2 and GOEM

Variables	Ego orientation		Task orientation	
	<i>r</i>	95% CI	<i>r</i>	95% CI
Intrinsic regulation	.102*	.005 to .197	.345*	.257 to .427
Introjected regulation	.134*	.038 to .228	.174*	.079 to .266
External regulation	.157*	.061 to .250	-.179*	-.271 to -.084
Amotivation	.109*	.013 to .203	-.355*	-.437 to -.268

*All values are statistically significant ($p < .05$).

Table 4. Cronbach’s alpha statistics of scale

Variables	Items	Mean (Sd)	Cronbach’s alpha
Ego orientation	5	3.25 (1.34)	.90
Task orientation	5	4.79 (.45)	.87

Table 5. Test-retest results

Test		Retest	
		1	2
Test	1. Ego orientation	.88*	
	2. Task orientation		.87*

* $p < .01$.

4. Discussion

Based on the need for theoretically developed instrument measuring exercise goal orientations in Turkish context, the purpose of this study examined the psychometric properties of the Turkish version of GOEM. For this purpose, factorial and construct validity as well as the reliability was tested for the Turkish version of GOEM.

As stated in AGT, an individual’s goal orientations were divided in two major groups (i.e. task orientation and ego orientation) in physical activity domain (Nicholls, 1984; Ntoumanis & Biddle, 1999). As stated in the first hypothesis, factor analytic results showed that the Turkish version of GOEM had two-dimensional factorial structure (both eigenvalues > 1.00). This finding provides evidence that the Turkish version of GOEM was reflected by two goal orientations toward exercise behavior. Two-dimensional structure of the measure was consistent with AGT (Nicholls, 1984, 1989), the original (Petherick & Markland, 2008) and the Slovenian version of the measure (Dolenc, 2015). This suggested that a person’s goal orientation in exercise setting could be either task-oriented (i.e. based on comparing own performance with others in the setting) or ego-oriented (i.e. based on personal improvement in the setting). The reliability of the measure was evaluated using Cronbach’s alpha scores and test-retest reliability. Cronbach’s alpha scores were found high for task orientation and ego orientation (.87 and .90, respectively).

CFA indicated that Turkish version of GOEM had good fit proved with high fit indexes (AGFI = .95; GFI = .97; CFI = .98; NFI = .97; TLI = .98; RMSEA = .045; SRMR = .049). These results were consistent with the original version (Petherick & Markland, 2008) and the Portuguese version (Cid et al., 2012). As expected in Hypothesis 2, these findings revealed an evidence for validation of the Turkish version of GOEM.

Convergent validity was tested by correlational analyses between the constructs of exercise goal orientations and behavioral regulations in exercise. Correlational analyses showed that both dimensions of GOEM had significant positive and negative correlations with behavioral regulations in exercise (ranging from $-.36$ to $.34$). These findings are partially consistent with our hypothesis. More specifically, the correlational results in the present study showed that ego orientation was positively correlated with external, introjected, and intrinsic regulations and with amotivation. As stated in AGT, ego orientations expected to be linked to controlling type of motivations, such as extrinsic and introjected regulations and amotivation (Nicholls, 1989). This relationship of ego-oriented goals with controlling type of motivation can be explained by that ego orientation is mainly based on social comparison with others in exercise setting (Biddle & Goudas, 1997). However, according to the self-determination theory (SDT), ego orientations do not always correspond to the construct of extrinsic motivation (Deci & Ryan, 2000). Although a positive correlation of ego orientation and intrinsic regulation was unexpected, this finding warrants further research.

On the other hand, task orientation was positively correlated with introjected and intrinsic regulations, and it was negatively correlated with external regulation and amotivation. These results indicating the correlation of task orientation and behavioral regulations were in line with the previous studies (Petherick & Markland, 2008). Task orientations expected to be related to intrinsic regulations and unrelated to extrinsic types of regulations. Those who were task-oriented exercisers focused more on self-referenced mastery of a task and improving their personal skills. They were also

likely to endorse intrinsic behavioral regulation. Although the correlation of task-orientation and introjected regulation was not expected, the positive association between introjected regulation and task orientation may be due to internalization. Introjected regulation involves the internalization of external motivations, which are then applied through self-imposed pressures with the intent of avoid guilt or to sustain self-esteem (Markland & Tobin, 2004). According to SDT, controlled types of motivations can be internalized and converted into autonomous types of motivations, if supportive conditions are in place (Silva et al., 2008).

Finally, the test-retest reliability was computed using Pearson correlation. The results indicated significantly high correlations between test and retest for task orientation and ego orientation (.87 and .88, respectively, all $p < .01$). This result was consistent with the Slovenian version of GOEM (Dolenc, 2015). As hypothesized, high alpha scores and correlations between test-retest for each orientation revealed strong internal consistency for the Turkish version of GOEM.

This research has some limitations. Although GOEM was evidenced to be a valid and reliable measure for Turkish culture, the gender invariance was not detected in this study. Petherick and Markland (2008) discussed no gender differences in task orientation but males outperformed females in ego orientation. Thus it can be argued that in terms of task orientation, GOEM was invariant across genders. However, further research needs to investigate which motivational factors affect gender differences in ego orientation. Another limitation was that, whether goal orientations would differentiate across exercise settings was not examined in this study. As discussed by Klain et al. (2014), exercise settings in which more socialization should occur (such as exercising with groups of people in fitness centers, in weight-lifting spaces, in pilates courses, etc.) would likely be related to ego orientation. However, the underlying goal orientation was unknown in exercise settings in which socialization could typically not have occurred (e.g. running alone, walking alone, etc.). This warrants further research.

Regardless of limitations, these initial findings of the present study revealed that GOEM is a valid and reliable measure for the Turkish sample. This measure can be used by researchers and practitioners in exercise, recreation, and physical activity domains.

Further research should take advantage of this instrument for comprehensive study of the tenets of AGT applied to motivated exercise behavior among Turkish-speaking participants.

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Author details

Gözde Ersöz¹
E-mail: gozde0007@gmail.com
Mine Müftüler²
E-mail: muftuler@hotmail.com
Tennur Yerlisu Lapa³
E-mail: tennur@akdeniz.edu.tr
Adile Tümer⁴
E-mail: tadile@mu.edu.tr

¹ School of Physical Education and Sports, Namık Kemal University, Namık Kemal Mahallesi, Kampüs Caddesi, Beden Eğitimi ve Spor Yüksekokulu, Tekirdağ 59000, Turkey.

² Faculty of Sport Sciences, Muğla Sıtkı Koçman University, Kötekli, Muğla 48000, Turkey.

³ School of Physical Education and Sports, Akdeniz University, Dumlupınar Bulvarı, Konyaaltı, Antalya 07058, Turkey.

⁴ Faculty of Health Science, Muğla Sıtkı Koçman University, Kötekli, Muğla 48000, Turkey.

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