Public Health VALIDITY AND RELIABILITY OF THE GREEK VERSION OF MODIFIED BAECKE QUESTIONNAIRE

Manuscript Draft-	

Manuscript Number:		
Article Type:	Original Research	
Keywords:	validation; reliability; adaptation; questionnaire; Greek version	
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VALIDITY AND RELIABILITY OF THE GREEK VERSION OF MODIFIED BAECKE QUESTIONNAIRE

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Acknowledgements

We would like to thank Dr. Konstantinos Chandolias for his useful comments and diligent proofreading of the manuscript.

Declarations of interest: none



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To the editor of *Public Health*

Lamia, 06/06/ 2021

Dear Editor,

Please find attached the manuscript entitled: **"Validity and Reliability of the Greek version of Modified Baecke Questionnaire"** authored by: Stefanouli V, Kapreli E, Anastasiadi E, Nakastsis A, Strimpakos N.

This current manuscript is focused on the study of the cultural adaptation, and investigation of the validity and reliability of the modified Baecke Physical Activity Questionnaire (mBQ) in a sample of healthy participants. The Baecke Questionnaire and the modified version have widely been used for measuring the level of physical activity in both healthy subjects and patients. Even if the original English form of the questionnaire has been translated and validated in many different languages and cultures, the validity and reliability of the mBQ have not been investigated among Greek speakers and culture. The cross-cultural adaptation of the mBQ was accomplished using internationally standard guidelines. The reliability was determined by filling out the mBQ on two occasions, one week apart. For validation, a threefold procedure was employed; correlations between the mBQ and the International Physical Activity Questionnaire (IPAQ), between mBQ and VO2max and between mBQ and interview (METS) were assessed. According to our results, Test-Retest Reliability of the mBQ was found satisfactory. Statistically significant correlation between the mBQ and the IPAQ, high correlation between the mBQ and METS and moderate correlation between mBQ and VO2max were found. Therefore, the Greek mBQ was found to be reliable and valid for assessing the level of physical activity in the Greek population.

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We would like to submit it for further consideration in *Public Health* Journal. The material included in this manuscript has not been and will not be submitted or published in any other journal. Part of the material has been presented as a poster in WCPT Congress 2015 in Singapore (abstracts of this congress have been published as a supplement in Physiotherapy Journal). All authors of this manuscript acknowledge that they have read, and approve of, the content of the manuscript as submitted.

Thank you in advance for your consideration,

Sincerely yours

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VALIDITY AND RELIABILITY OF THE GREEK VERSION OF MODIFIED BAECKE QUESTIONNAIRE

ABSTRACT

Objectives: The purpose of this study was to translate and investigate the validity and reliability of the modified Baecke Physical Activity Questionnaire (mBQ) in the Greek adult population.

Study Design: This is a cross-cultural study.

Methods: The cross-cultural adaptation of the mBQ was performed according to official guidelines. The pre-final Greek translation was tested in 30 healthy participants. The reliability was determined (n=100) by filling out the mBQ, two times, one week apart. For validation (n=45), the scores between the mBQ and the IPAQ were compared and the correlation between mBQ and VO2max and between mBQ and interview (METS) were assessed.

Results: High statistical significant of Test-Retest Reliability was found (ICC=.84; SEM=0.48; SDD=16.7%; Cronbach's alpha=0.92).Statistical significant correlation between the mBQ and the IPAQ (r=0.425, p=0.005), high correlation between the mBQ and METS (r=0.691, p=0.000), moderate correlation between mBQ and VO2max (r=0.388, p=0.08) were found.

Conclusion: The Greek mBQ was found to be reliable and valid for assessing the level of physical activity in the Greek population.

Key words: validation, reliability, adaptation, questionnaire, Greek version

ClinicalTrials.gov Identifier: NCT04890756

1. INTRODUCTION

«Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that results in energy expenditure». There is incontrovertible evidence that participation in regular activities promotes many health benefits by improving physical and psychological well-being ^{1, 2}. The health benefits can be achieved by following International guidelines that recommend a weekly routine of 150 minutes of moderate exercise ³. On the contrary, physical inactivity is associated with more than 35 chronic diseases/conditions ⁴. Many studies have shown that physical inactivity is an important modifiable risk factor for many common diseases like cardiovascular diseases, osteoporosis, type II diabetes, and depression ^{3, 5, 6}. Moreover, 9% of premature mortality is attributed to physical inactivity by making it similar to the risk factors of obesity and smoking. The limitation of physical inactivity might increase the life expectancy of the world's population to 0, 68 years ⁷. As a result, it would be quite helpful for health professionals to have accurate, valid, and reliable measures for evaluating the level of physical activity and functional status of their patients. In this way, they could improve patients' well-being and prevent multiple potential diseases.

There is no globally accepted gold standard for assessing the level of physical activity in a population, as it is considered a complex and multidimensional exposure variable. However, there are many direct and indirect methods for measuring habitual physical activity ^{8, 9}. For direct measurement of physical performance, it could be used the activity monitor by using different tools such as accelerometers, pedometers, heart rate monitors, etc. ¹⁰. One of the most valid direct methods for measuring energy expenditure in free-living adults is the doubly labeled water method (DLW). This method allows participants to maintain their habitual activities, causing only minimal inconvenience. However, it is considered unsuitable for use in large population studies, because of its high cost and time-consuming process ^{11, 12}.

On the other hand, indirect methods include data collection procedures such as self-reporting questionnaires, PA diaries, and interviews ¹⁰. Each method has its advantages and limitations. Although all previous referred technological tools have raised the objectivity and accuracy of PA estimation, they are quite costly and sometimes time-wasting. Contrary to the above, self-reported questionnaires could be used in large samples and cover longer time frames leading to recall bias. The advantages of using questionnaires for assessing PA are considerable because they are convenient, time-saving, cost-effective, and easy to access and they have scoring flexibility ¹³. All these advantages, making them the most suitable and efficient choice for measuring PA performance in large populations even if there is always a risk of participants to underestimate or overestimate their answers during filling it.

A various number of available questionnaires exist for measuring PA^{14, 15}, one of the most frequently used is Baecke Questionnaire (BQ). The advantages of being short, self-administrated and easy to fill make the Baecke questionnaire an attractive and preferable assessment tool for use in a busy clinical setting. Baecke Habitual Activity Questionnaire was developed by Baecke and coworkers for measuring PA in healthy populations ¹⁶. Some years later, Voorrips and colleagues slightly modified this questionnaire to capture PA performance in the elderly by adding and modifying some questions ¹⁷. Based on Baecke questionnaire Pols and colleagues developed a modified version (Modified Baecke Questionnaire) by adding 3 more questions. Therefore, the

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Baecke questionnaire consists of 16 questions against its modified version that includes 19 questions. Moreover, the original version is self-administrated against modified which is interview administrated by clinicians ¹⁸. The current study selected the modified version as there is no significant difference between self-administrated questionnaires and interview-administrated by clinicians ¹⁹. We consider that the presence of a clinician during the filling of questionnaires provides a scientific approach in our methodology, even if a self-administrated questionnaire can collect more subjects. Moreover, the modified version may be considered more evolved as it includes 3 more questions than the original. Both original and modified versions can be applied in patients such as patients with HIV, obesity, cardiovascular diseases, hip disorders, etc. ²⁰⁻²⁵. As a consequence, the validity and reliability of Baecke Questionnaire and the modified version as PA measurement tools have been assessed in both healthy and unhealthy populations. Besides, the questionnaires are valid and reliable in many different languages such as Dutch ²⁶, French ²⁷, Persian ²⁸, Korean ²⁹, Brazilian ³⁰, Chinese ³¹, Japanese ²⁰, Spanish ³². However, the validity and reliability of the questionnaire have not been assessed yet in Greek adults.

2. METHODS

The purposes of the present study were to translate, modify, and investigate the validity and reliability of the Modified Baecke Questionnaire in the Greek adult population. The present study was divided into 3 phases: 1) translation and cross-cultural adaptation process 2) assessment of the Test-Retest Reliability and 3) assessment of the Validity. The protocol of studies was approved by the Ethics Committee of the Department of Physiotherapy of the

2.1 PHASE 1: Translation and cross-cultural Adaptation

The plan of translation and cross-cultural adaptation of the Modified Baecke Questionnaire was based on the methods indicated in the scientific literature ³³. The whole process consists of the following five steps (Figure 1):

Figure 1. Phases of translation and cross-cultural adaptation



Step I: Forward Translation – Two Professionals translators, who were native Greek speakers and fluent in both English and Greek, translated the original English version of the questionnaire into Greek by working independently. Therefore, two independent Greek translations (T1 & T2) of the questionnaire were produced. Two reports were also written by both translators indicating their comments on any difficulties that faced during the translation process.

Step II: Synthesis – The results of both translations (T1 & T2) were compared and synthesized by the two translators after discussing any discrepancies between the translations. The translators reached consensus on one common Greek questionnaire.

Step III: Backward Translation – The common Greek language version (T12) was back-translated into English by two official English Translators who have been in an English-speaking country for more than 5 years. The back translations (BT1 and BT2) were produced without the two translators being aware or informed of the study concept. Moreover, the translators examined whether there was a semantic, conceptual, and experiential equivalence between the English original to the back-translated one.

Step IV: Harmonization – To produce the pre-final Greek language translation, the 4 Greek translators organized a harmonization meeting where they discussed any discrepancies between the original and translated versions. Furthermore, they evaluated semantic, idiomatic, experiential and conceptual equivalences and reached consensus on a pre-final version of the questionnaire that was eligible for pilot testing.

Step V: Pilot study of the pre-final version – A pilot study was conducted for examining the comprehensibility, linguistic validation, and completeness of the pre-

final version of the questionnaire. The pre-final Greek translation was tested in 30 healthy participants. The sample was selected randomly. The inclusion criteria for the sample were: age above 18, Greek native speakers, Greek inhabitants, and sufficient cognitive functioning. After signing an informed consent form, the participants filled the questionnaire under the supervision of an examiner. The examiner documented any problems and difficulties that occurred during the administration of the questionnaire. Each participant after filling the questionnaire participated in an interview organized by the examiner. At the end of the interview, each participant was asked to provide comments related to the completeness of the questionnaire and identify any words or phrases that were difficult to understand. Finally, any discrepancies that remained were discussed among the 3 translators and the examiner/interviewer to conclude to a consensus final version.

2.2 PHASE 2: Assessment of Test-Retest Reliability

The final version of the mBQ was tested on 100 participants (55 males and 45 females). The inclusion criteria of the sample were the same as the pilot's study. To assess test-retest reliability the participants were requested to complete the mBQ on two occasions, one week apart.

2.3 PHASE 3: Assessment of Validity

For examining the construct validity of the mBQ three different measurement methods were employed. These methods included the measurement of VO_{2max} during Astrand-Rhyming Test and an interview about participants' activities during a typical work and non-work day. Moreover, concurrent validity was measured by comparing the results of the final Greek mBQ with the results of the Greek version of the International Physical Activity Questionnaire (IPAQ)³⁴.

2.3.1 Design and Participants

For the validation study, 45 healthy subjects participated (23 males and 22 females, age range 18-60 years). The sample was convenient and the exclusion criteria were: 1) age under 18, 2) poor health status, 3) poor Greek language comprehension, 4) diagnosed with cardiovascular diseases 5) cardiac pacemaker, 6) medication that prevents exercise activity, 7) neurological disorders with effect on the lower body, 8) musculoskeletal disorders or injuries on the lower body in the last 3 months, 9) PAR-Q health risk assessment form ³⁵.

For the concurrent validity of the mBQ and the IPAQ questionnaires, the same sample as with the test-retest reliability study was employed. The data were collected at the Laboratory of the supervision of the Department of Physiotherapy of the supervision of two physiotherapists/researchers.

2.3.2 Procedure

All participants filled the PAR-Q questionnaire for examining if they could participate in the study and completed a consent form after they got informed about the whole

process of the study. Before participants start the measurements, the researchers completed a form with the body size measurements (height and weight) and the age of each participant.

Astrand-Rhyming Test for V02max Assessment

Aerobic capacity is expressed as maximal oxygen consumption (VO2max) and it was assessed with the indirect method known as Astrand–Rhyming cycle ergometer test ³⁶. This method is recommended for people of various ages^{37, 38}. Each participant performed a 6-min submaximal exercise test by using the ergometer bike (Monark).Before starting the test, the researcher adjusted seat height to fit the subject. Moreover, the heart rate of participants was monitored continuously during testing by the Garmin Vivofit Heart Rate Monitor. Heart rate monitoring is necessary during the testing because of the linear relationship between VO2 and heart rate to predict VO_{2max} $^{36, 38}$. Initially, subjects rested for 2 min for measuring resting heart rate, after that, there is a five min warm-up period at a low intensity to allow the participant to practice and get familiar with the pace. The researcher instructed the participants to maintain a steady cadence throughout the test and recorded the participants' HR at 5 and 6 minute. These values were used for determining VO_{2max} by using the Astrand-Rhyming nomogram, results were then normalized to age. Once the test was completed, the participants should cool down until HR and breathing rate return to normal ³⁶. The test could be interrupted if threatening symptoms appeared on participants or when the HR reached 85% of the age-predicted maximum heart rate. After a relaxing period, the participants took part in an interview related to their daily routine.

Interview for daily routine activities

Interview was one more measurement tool, which was used for assessing the validation of questionnaire results. The interview aimed to gather sufficient information about the participants' physical activity during the week to calculate the total amount of energy expenditure (METs) per week, so the questions were related to the job, sports, and leisure time of the interviewee ³⁹. Through these opened-ended questions, the volunteer was able to describe the activities he performed during a typical working day as well as a typical non-working day ²⁷. For calculating METS of daily activities of each participant a Compendium of Physical Activities was used. The Compendium provided a list with several activities linked to their respective metabolic equivalent intensity levels (e.g. for resting the MET level was 0.9 (sleeping) and the level of MET for running was 18 (running at 10.9 mph)) ³⁹. The interview began with a general process description and the building of rapport between interviewer and participant. The average duration of the interview was 30 minutes and was recorded using a laptop microphone that was connected to a computer. The program used for the interview was audacity 2.1.1. After completing the interview process, the participant filled the mBQ.

Modified Baecke Questionnaire

The questionnaire includes 3 different categories of questions that are related to household activities, sports and, leisure time activities in the previous 12 months. The overall number of questions is 19. The questions about work have three to five possible answers, categorizing the activity from inactive to very active. Participants were

instructed to consider studying or household activities as their work in case that was their main daily activity. The questions of sports activities include the activity type, the frequency of activity performance, and the number of months annually that the activity is performed. The questions on leisure time activities have 5 possible answers. Participants have to choose only one answer for each question of the questionnaire. All items result in a separate score. The sum of the answers' scores obtained from each category represents the level of individual physical activity. The total score varies from 3-15. The higher the score value the better the level of physical activity ¹⁸. After completing the whole process, participants got informed about their results via emails (Appendix 1).

International Physical Activity Questionnaire (IPAQ)

The IPAQ is considered a quite valid and reliable measurement tool of physical activities ^{34, 40}. It was developed by the World Health Organization in 1988 ⁴¹. There are four long (31 questions) and four short (9 questions) versions of the IPAQ that can be self-administered or answered via phone call ⁴². All forms have been assessed as validated against accelerometer measurements. However, many researchers prefer to use the short form as it has equivalent psychometric properties to the long-form. IPAQ has been investigated and used in a variety of different populations until now ^{34, 40}. Greek adults are one of them, as the reliability and validity of the IPAQ have already been examined in the Greek language Therefore, it is considered an acceptable tool for assessing the validation against the mBQ in terms of evaluation of physical activities ⁴³.

2.4 Statistical Analysis

The analysis of test-retest reliability was performed with descriptive and inductive statistical analysis using the program "Statistical Package for the Social Sciences" (SPSS, version 22.0). For checking test-retest reliability, the Intraclass Correlation Coefficient ICC was used, along with the standard measurement error (Standard Error of Measurement SEM) and the Smallest Detectable Difference SDD between variables (parametric tests). The Spearman rho correlation coefficient was used for the correlation between the modified Baecke questionnaire and the IPAQ questionnaire. The significance test was performed at level p < 0.05.

The analysis of validity was performed in IBM SPSS Statistics (v. 22.0). The variability control of variables was tested using the Kolmogorov-Smirnov statistical test where a variable is considered to have a normal distribution if the statistical significance value p is greater than the value $\alpha = 0.05$. According to the results of the Kolmogorov-Smirnov statistical test, all variables were found to have a statistically insignificant difference with the normal distribution and are considered to be of normal form. In addition to the descriptive analysis of the data, a correlation test was performed between the variables using the Pearson correlation factor. The probability level at which the statistical correlation tests were performed between each parameter of the mBQ and the IPAQ. The normality of the data was tested with the Kolmogorov-Smirnov test that showed that data of Baecke questionnaire data were normally distributed while the data of IPAQ questionnaire was irregularly distributed.

3. RESULTS

3.1. Translation and Cross-cultural Adaptation Process

The mBQ was translated into Greek and then culturally adapted. Difficulties arising during its development were considered minor. The thirty patients participating in the pilot study did not face any discrepancies in meaning or terminology in the Greek version of the questionnaire. Furthermore, the participants did not request assistance in interpreting the questionnaire and were able to understand all the statements in the questionnaire, so no modification to the text was required.

3.2 Test-Retest Reliability

For examining reliability, a hundred participants (55 males, 45 females) completed the mBQ twice, one week apart (Table 1). The reliability was very good (ICC=0.84, SEM=0.48; SDD=16.7 %) and a Cronbach α of 0.92 was obtained.

	n	Age	Height	Weight
		(mean ± SD)	(mean)	(mean)
Total	100	26,5 ±9,5	173,8	71,6
Males	55	28 ±10,2	179,4	81,6
Females	45	24,6 ±8,2	178	59,4

Table 1Participant characteristics.

3.3 Validity

For assessing construct validity, 45 healthy participants (23 males, 22 females) with a mean age of 26.8 (±10.40) years (range: 18–59 years) took part in 3 different tests (V02max measurement, METS measurement, Baecke questionnaire) (Table 2). According to the results, a low correlation was found, in the total sample (n = 45), between the Baecke total and VO2max sections (r = 0.388, p = 0.008), while in the same sections a moderate correlation was found (r = 0.577 p = 0.004) in the male sample (n=23). The final correlation in the study was between the interview (the results were calculated with the METs as a unit of measurement) and the modified Baecke. The results showed that there was a moderate to high correlation between Baecke total and METs. More specifically in the whole sample (n = 45), (r = 0.691, p = 0.000), in the sample of women (n = 22) (r = 0.758, p = 0.000) and in the sample of athletes (n = 14) (r = 0.792, p = 0.001).

	n	Age (mean ± SD)	Height (mean)	Weight (mean)
Total	45	26,80 ± 10,40	1,7184	69,8767
Males	23	27,91 ± 11,208	1.7926	81,5239
Females	22	25,64 ± 9,609	1,6409	57,7000

For examining concurrent validity between the mBQ and the IPAQ questionnaires the same sample as with test-retest reliability study was employed. Findings revealed that the correlation between total Baecke and total IPAQ score was low positive (r=0.425, p=0.005) (Table 3).

Table 3Concurrent Validity between the mBQ and the IPAQ.

	Baecke total	Work	Sport	Leisure
IPAQ total	.425**	.372**	.247*	0.50
IPAQ A	.349**	.234*	.300**	031
IPAQ B	.137	.118	.080	.102
IPAQ C	.365**	.163	.205*	362**

* = <0.001, **= <0.005

Table 2

Participant characteristics.

4. DISCUSSION

The increasing problem of physical inactivity, along with the need to have a measuring tool for assessing physical activity in Greek population led to the adaptation of the modified Baecke questionnaire in Greek language. The original version of the Baecke questionnaire is in English language ¹⁶, so its translation and cross-cultural adaptation in Greek population were necessary. The need of using validated and reliable tools for measuring levels of physical activity led to the assessment of its psychometric properties (namely the validation and reliability). This questionnaire was chosen in many studies as it is short, simple, valid, reliable, and easy to use.

Test-Retest Reliability and validity of the BQ and mBQ have been already examined in different populations speaking different languages (Table 4). Even though the mBQ includes 3 more questions at the leisure time activities filled in comparison to BQ, the results of validity and reliability were still comparable. Most translations and cross-cultural adaptations were based on the original version. However, the results in most studies were similar. More specifically, many ICC values of BQ and mBQ questionnaires in different languages were reported as acceptable values, suggesting it as a reliable tool ²⁸. For example, ICC values of the BQ/mBQ in Japanese (ICC=0.87) ²⁰, Persian (ICC= 0.88, Cronbach's Alpha coefficient > 0.7) ²⁸, Flemish (ICC=0.88, 0.20)

<Kappa values< 0.73). ²⁶, Spanish (ICC=0.96, Cronbach's alpha coefficient = 0.97) ³², Chinese (ICC=0.65-0.90)³¹, Korean (Cronbach's alpha coefficient: 0.73 (work),0.78 (sport),0.35 (leisure)) ²⁹ and French (ICC=0.87, Kappa > 0.60) ²⁷. The results of the present study show that ICC value was 0.84. Therefore, the ICC value is consistent with those obtained for the BQ/mBQ in different language populations.

For assessing the concurrent validity of the mBQ, we used the IPAQ. As stated by Papathanasiou et al., the Greek version of IPAQ is a valid and reliable tool to evaluate the level of physical activities in Greek speakers ⁴³. The results showed a statistically significant correlation between the mBQ and the IPAQ (r=0.425, p=0.005). For evaluating the construct validity of the mBQ, the METS calculation via interview was used. The correlation between the mBQ and the interview (r = 0.691, p=0.000) was the highest compared to other methods used. Similar results were obtained by Vol et al. (2011) in their study conducted for the adaptation of the questionnaire in French²⁷. This could be explained as the interview is considered the most appropriate tool to prove the validity of a questionnaire. Moreover, the measurement of VO2max was used for assessing the construct validity of the mBQ. Nevertheless, the correlation between the questionnaire and VO2max, although lower than the interview (r=0.388, p = 0.008), was statistically significant. Another study also found low correlation between Total Baecke and VO₂max (r=0.17, p=0.470). It is known that VO₂max is related to physical activity. In samples that there is heterogeneity according to physical activity, there will be a lower correlation ³⁰. The sample of the current study was mostly non-athletes, thus a lower correlation was expected.

	Language	Sample	Methods	Results		
				Reliability	Validity	Mean Total
*Philippaerts	Dutch	90 (males)	Reliability:1-month test-	ICC=0.88	Based on	Score (SD) 7.9 (± 1.4)
et al. (1998)			retest Validity: 1) physical activity between 3 levels of professional status 2) means of a principal- component analysis study.	0.20 <kappa values< 0.73.</kappa 	component- loading matrix of the physical activity variables	8.0 (± 1.4) 8.8 (± 1.8)
*Florindo et	Portuguese-	21 (males)	Reliability: Test-retest (45	ICC=0.77	1) r=0.17(p=	7.39 (± 1.29)
al. (2003)	Brazilian	(,	days) Validity: 1)VO2max 2)%DHR		0.470) 2) r=0.48 (p=0.027)	
*Lee et al. (2004)	Korean	507 (males=318, females=189)	Unclear-Korean language	Cronbach's alpha coefficient : 0.73 (work) 0.78 (sport) 0.35 (leisure)	Based on factor- loading matrix of the items about physical activity	7.4
*Ono et al. (2007)	Japanese	61 (females)	Reliability: Two week test- retest Validity: measured step counts (validity)	ICC=0.87	rho=0.49 (p <0 .01)	7.6 (± 1.4)
**Vilaró et al. (2007)	Spanish	55	Reliability: Test-retest (Two weeks to a month) Validity: 1)SGRQ 2)PM6M 3)FEV ₁ %	ICC=0.96 Cronbach's alpha coefficient = 0.97	rho=-0.45 (p <0.05) rho=0.54(p<0.05) rho=0,31 (p <0.05)	12.8 (IQR: 25- 75%= 9-17.1)
*Vol et. al (2011)	French	702	Reliability: 1)Two week Test-retest 2)Overtime test-retest (two months) Validity: interview	ICC=0.87 Kappa > 0.60	rho=0.39 (P < 0.0001)	8.31 (±1.21)
*Ho et al. (2015)	Chinese	198 (males=94, females=104)	Reliability: Two-week test–retest Validity: 3-day activity diary	ICC=0.65-0.90 Cohen's к: 41.0% (males) 56.7% (females)	r=0.61 (p<0.01)	8.81 (± 1.47)
*Sadeghisani et al. (2015)	Persian	Pilot: 20 Reliability: 32 Validity: 126 (males=66, females=60)	Reliability: Test-retest (3 - 7 days after the first session) Validity: IPAQ	ICC=0.88 Cronbach's Alpha coefficient > 0.7	r=0.36 (P = 0.00) (sitting position excluded) r=0.19 (P = 0.03) (sitting position included)	8.26 (± 1.33)
** **	Modified of N	Modified Baecke	2 Questionnaire			

The present study has a few limitations that have to be addressed. The first limitation is that the mBQ referred to activities of the past year whereas the IPAQ concerns the activities of the last week. Therefore, the comparison of results between the 2 questionnaires is quite difficult. However, IPAQ was used to correlate with the mBQ, as it is the only one physical activity questionnaire that has been tested for reliability and validity in Greek culture. Another limitation was that the sample included only the age range of 18-59 years, so its validity has not still been proven for use in the elderly and minors in Greece. The final limitation was that only healthy participants were included in the current study. These limitations suggest further research to prove the validity of the mBQ in a wider age range as well as the application in various diseases.

The results of the current study have great clinical significance. It is the first time that the modified Baecke questionnaire has been intercultural adapted and controlled in terms of validity and reliability in Greece. The mBQ can be a useful and easy-to-use tool for Greek clinicians and researchers for evaluating and monitoring physical activity in Greece, so it has an important clinical contribution except for scientific ones. Furthermore, it was the first time that mBQ was used and correlated with the IPAQ questionnaire for physical activity in the Greek population. The present study helped to investigate the validity and reliability of the questionnaire as a commonly accepted clinical tool. Last but not least, it is important to be clarified when the original or the modified version of the Baecke questionnaire is used according to research good practice.

5. CONCLUSION

In conclusion, the modified Greek Baecke Questionnaire was found to be a reliable and valid tool for measuring habitual physical activity in the Greek population. That means the mBQ could be a valuable tool for Greek healthcare professionals in both clinical and research environments. Moreover, further research is needed to evaluate the validity of the questionnaire to children and the elderly, as well as its use in different patient groups.

Clinical Messages

- The Greek version of Modified Baecke is reliable and valid.
- It is a useful and easy-to-use tool for Greek clinicians and researchers.
- It is necessary the clarification between the use of the original or modified version of the Baecke questionnaire in studies.

Declaration of conflicting interests

None.

Funding

None.

Competing interests

None declared.

Ethics Approval

The questionnaire and methodology for this study was approved by the Human Research Ethics committee (Ethics approval number: 1008/01-9-2015).

Consent to Participate

Informed consent was obtained from all individual participants included in the study

ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ MODIFIED BAECKE ΓΙΑ ΤΗ ΣΥΝΗΘΗ ΦΥΣΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ

Ερωτηματολόγιο Modified Baecke για τη συνήθη φυσική δραστηριότητα

ΚΩΔΙΚΟΣ	

1.	Ποιό είναι το κύριο επάγγελμά σας;	1-3-5
2.	Στη δουλειά κάθομαι ποτέ/σπάνια/μερικές φορές/συχνά/πάντα	5-4-3-2-1
3.	Στη δουλειά στέκομαι όρθιος ποτέ/σπάνια/μερικές φορές/συχνά/πάντα	.1-2-3-4-5
4.	Στη δουλειά περπατώ ποτέ/σπάνια/μερικές φορές/συχνά/πάντα	1-2-3-4-5
5.	Στη δουλειά σηκώνω βαριά αντικείμενα ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά	1-2-3-4-5
6.	Μετά τη δουλειά είμαι κουρασμένος ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά	1-2-3-4-5
7.	Στη δουλειά ιδρώνω ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά	1-2-3-4-5
8.	Σε σύγκριση με άλλους της ηλικίας μου νομίζω ότι η δουλειά μου πολύ ελαφρότερη/ελαφρότερη/το ίδιο σκληρή/σκληρότερη/πολύ σ 3-4-5	είναι σωματικά τκληρότερη1-2-

9. Παίζετε κάποιο σπορ; Ναι/ όχι

Εάν ναι:

-Ποιό σπορ παίζετε ποιό συχνά;
-Πόσες ώρες την εβδομάδα;<<1/1-2/2-3/3-4/>4
-Πόσους μήνες το χρόνο;<<1/1-3/4-6/7-9/>9
Εάν παίζετε ένα δεύτερο σπορ:
-Ποιό σπορ είναι αυτό;
-Πόσες ώρες την εβδομάδα;<1/1-2/2-3/3-4/>4
-Πόσους μήνες το χρόνο;<<1/1-3/4-6/7-9/>9
10. Σε σύγκριση με άλλους της ηλικίας μου νομίζω ότι η φυσική μου δραστηριότητα κατά την διάρκεια του ελεύθερου χρόνου μου είναι πολύ λιγότερη/λιγότερη/η ίδια/περισσότερη/πολύ περισσότερη1-2-3-4-5
 Κατά την διάρκεια του ελεύθερου χρόνου μου ιδρώνω ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά1-2-3-4-5
 Κατά την διάρκεια του ελεύθερου χρόνου μου παίζω σπορ ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά1-2-3-4-5
13. Κατά την διάρκεια του ελεύθερου χρόνου μου βλέπω τηλεόραση ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά5-4-3-2-1
14. Κατά την διάρκεια του ελεύθερου χρόνου μου περπατώ ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά1-2-3-4-5
15. Κατά την διάρκεια του ελεύθερου χρόνου μου κάνω ποδήλατο ποτέ/σπάνια/μερικές φορές/συχνά/πολύ συχνά1-2-3-4-5
16. Πόσα λεπτά περπατάτε και/ή κάνετε ποδήλατο την ημέρα προς και από την δουλειά, σχολείο και ψώνια; <5/5-15/15-30/30-45/>45

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