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Cross-cultural modifications and measurement properties of the CHAMPS questionnaire among Chinese older adults

Yanan Zhao ^{a, *}, Qianwen Wang ^a, Pak-Kwong Chung ^b, Keshu Cai ^c

^a School of Sports Science and Physical Education, Nanjing Normal University, Nanjing, Jiangsu, 210097, China

^b Department of Sport and Physical Education, Hong Kong Baptist University, Hong Kong, China

^c Department of Rehabilitation Medicine, The First Affiliated Hospital of Nanjing Medical University, Nanjing, Jiangsu, 210046, China

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ABSTRACT

Background/objective: The Community Health Activities Model Program for Seniors questionnaires (CHAMPS-Q) is one of the most extensively used instruments in assessing physical activity among older adults. However, no study had translated the CHAMPS-Q into Chinese, and no evaluations were made on the psychometric properties of the CHAMPS-Q among the Chinese population. Considering cultural differences in perceptions of language, cultural context and living habits, this study was of necessary to 1) translate and cross-culturally adapt the original CHAMPS-Q, and 2) examine the test-retest reliability and construct/predictive validity of the Chinese version of the CHAMPS-Q.

Methods: The English CHAMPS-Q was first translated into Chinese, synthesized, back-translated, and revised by an expert committee according to the pre-test results. The Chinese CHAMPS-Q was then assessed in a cross-sectional study consisting of 101 apparently healthy older adults. Test-retest reliability test was conducted with 7 days apart. The construct validity of the Chinese CHAMPS-Q was tested against accelerometer data, and the predictive validity was assessed against physical fitness as measured by the Senior Fitness Test.

Results: The Chinese CHAMPS-Q has moderate to excellent test-retest reliability ($ICC = 0.72-.96, p < .05$). Energy expenditure and duration in PA significantly correlated with all accelerometry outcomes ($\rho = 0.22-.31, p < .05$). All the outcomes from the CHAMPS-Q showed significant correlations with upper body muscle strength ($\rho = 0.22-.34, p < .05$).

Conclusion: The Chinese CHAMPS-Q has excellent test-retest reliability and acceptable construct and predictive validity in assessing the physical activity of Chinese older adults.

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Introduction

Physical activity (PA) has tremendous meaning to older adults including but not limited to maintaining an active lifestyle, improving quality of life and promoting optimal functionality.¹ It is of general agreement that a valid and reliable assessment is essential to monitor daily activity levels scientifically, achieve the best benefits from regular PA, and give evidence-based public health recommendations.² To date, both objective and subjective PA measurements have been developed, such as pedometer/accelerometer and a variety of questionnaires/scales accordingly.

No consensus has been made on the optimal PA measurement among the older population. Recalling questionnaires could have some potential bias in evaluating PA levels among older adults, considering aging-related degradations in memory and recalling.³ However, the questionnaire measurement is still widely adopted given its convenience and cost-effectiveness, especially in extensive sample survey and in frail/pre-frail population.⁴

Up to date, there are at least 13 widely used PA questionnaires for the older population, such as the physical activity scale for the elderly, Yale physical activity scale, 7-day physical activity scale.⁵ Of these questionnaires, the Community Healthy Activities Model Program for Seniors questionnaire (CHAMPS-Q) is unique given it was developed to sensitively detect changes of PA over time.⁶ The CHAMPS-Q covers a broad spectrum of activities with different intensities that typically undertaken for daily life in late years.

* Corresponding author. Wenyuan Road No.1, Qixia District, Nanjing, China.
E-mail address: zhaoyan125@qq.com (Y. Zhao).

Besides, the CHAMPS-Q could be more preferred for those primarily underactive older adults since a specific part was designed for activities without any working intensity or quite low intensity. According to the compendium of PA energy costs,⁷ a metabolic equivalent (MET) value is assigned to each PA with the adjustment for the likely intensity of each PA among older adults.⁶ Therefore, the CHAMPS-Q can simultaneously provide both the PA energy expenditure alongside those usually reported parameters such as weekly frequency and duration of activities.⁶

Influenced by oriental culture, Chinese older adults prefer light-to-moderate activities, and their habitual PA mainly relates to domestic work and recreational activity.⁸ According to a national survey conducted by the Chinese Center for disease Control and Prevention, nearly 71% Chinese older adults aged 60 and over were primarily underactive; while among those having a regular exercise habit, they would prefer light-intensity PA.⁹ With this context, many PA questionnaires (e.g., International Physical Activity Questionnaire) may overestimate PA levels¹⁰ and may not be appropriate for Chinese older adults due to the potential floor effect of the measurement. The CHAMPS-Q is specifically designed to minimize the social desirability by including non-physical activities, and as said above, it covers a wide spectrum of activities. All these would make the CHAMPS-Q could be a preferred PA assessment method for Chinese older adults.

To date, many studies have reported accepted validity and reliability of the CHAMPS-Q in a variety of older population,¹¹ some even made modifications to suit the needs of the local population.^{12,13} However, no study has translated the CHAMPS-Q into Chinese, and no evaluations were made on the psychometric properties of the CHAMPS-Q among the Chinese population. Considering cultural differences in perceptions of language, cultural context and living habits, this study was of necessary to 1) translate and cross-culturally adapt the original CHAMPS-Q, and 2) examine the test-retest reliability and construct predictive validity of the Chinese version of the CHAMPS-Q (i.e., Chinese CHAMPS-Q). Results from this study would provide a new and suitable instrument to monitor PA levels for Chinese older adults.

Materials and methods

Sample

By taking the convenience sampling method, a group of 110 apparently healthy older adults aged between 65 and 74 were recruited from two district multi-service senior centers in Nanjing, China. Each of the two senior centers has more than 800 registered members, and the majority are local citizens living in downtown. The qualified participants should be free from any cognitive diseases and live independently without any disease that would prevent doing daily activities. They were introduced with the Chinese CHAMPS-Q as well as the requirements for this study at the first information session.

Ethical consideration

This study was approved by the Committee on the Use of Human and Animal Participants in Teaching and Research of the Xxx University. Written informed consents were obtained from all participants. Anonymity of all participants was ensured by allocation of name codes.

Procedure

Stewart and his colleagues developed the CHAMPS-Q with the purpose to evaluate an intervention of increasing PA among older

adults.⁶ The CHAMPS-Q contains 41 items covering various types and intensity levels of PA. To facilitate the accurate reporting of PA, it provides the specific PA on the left side of the page and asks the respondents to report the frequency (times per week) in a typical week of the past four weeks and an approximate duration (in hours) of the participation over the entire week. Considering those underactive individuals would make a negative response to most of the moderate and/or vigorous PA, the CHAMPS-Q incorporates non-exercise physical activities to reduce the socially desirable responding. Each specified activity has a MET value, and therefore, the energy expenditure per week can be estimated in either PA or moderate-to-vigorous PA (MVPA). Moreover, a total frequency score (times per week) can be calculated across all relevant activities.

According to the methodology proposed by Beaton and his colleague,¹⁴ the process of questionnaire modification in this study included five steps: 1) the initial translation, 2) synthesis of translations, 3) back-translation, 4) revisions by an expert committee and 5) a test of the pre-final version. The English version of the CHAMPS-Q was first translated into Chinese by two independent bilingual translators whose native language was Chinese. One translator came from the University Linguistic Center and did not know the CHAMPS-Q. The other translator specializing in exercise rehabilitation had been given detailed information about the study purpose and the characteristics of the CHAMPS-Q. Two researchers in the author list involved in the questionnaire synthesizing process. Discrepancies were analyzed until consensus can be made. Another two bilingual translators from the University Linguistic Center with English as their native language completed the questionnaire back-translation. All the researchers in this study constituted an expert panel to assess the semantic, idiomatic, cultural and conceptual equivalences of all the items in both English and Chinese versions of the CHAMPS-Q. For activities considered being incompatible with Chinese culture, they were substituted with the typical activities that have similar metabolically equivalent to the original CHAMPS-Q. The 2011 compendium of physical activities⁷ provides the guideline for energy expenditure to ensure the substituted items were equivalent in MET to the original items in the English version.

The pre-final Chinese CHAMPS-Q was then self-administered to 20 participants who were randomly selected from the computer-generated participant list (men = 10; mean age = 68.7 yrs). Each of them was face-by-face interviewed with the opinions on 1) the suitability of the activities, 2) the clarity of each item, and 3) the wording of each question. Participants' responses were assembled and sent to expert team for further discussion. After a thorough consideration, seven items were finally replaced by those daily activities having similar MET and typically undertaken by Chinese older adults (see Table 1 for detailed information). In addition, instead of asking to recall activities in 'a typical week over the last 4 weeks', the Chinese CHAMPS-Q requires participants to recall the activities in 'a typical week recently'.

For test-retest reliability, all the participants were asked to fill in the Chinese CHAMPS-Q twice with 7-day time interval (T1 and T2). Demographic data were collected for each group through face-to-face interviews. Participants were required to complete the Chinese CHAMPS-Q by themselves. For those who cannot read or write, a research assistant with a master degree in sport science provided help on site. The research assistant had been fully trained on how to objectively ask questions to reduce possible data bias.

Construct validity of the Chinese CHAMPS-Q was assessed by comparing testing outcomes between the CHAMPS-Q and the accelerometer (ActiGraph GT3X+, ActiGraph, Pensacola, FL, USA). Each participant was given detailed verbal instruction on how to use and wear the accelerometer. They were asked to wear the equipment on the waist for consecutive 7 days all day long except

for bath, swimming, and sleep. Then 7 days later, they sent the accelerometers back with self-reported accidental situations, such as equipment lost/damage, forgetting to wear on time. The 10s epoch time was used for data recording. Weekly energy expenditure, step counts, time spent in PA and MVPA were calculated using Freedson's equation.¹⁵

Relationships between physical activity as measured from the Chinese CHAMPS-Q and functional fitness as tested by the Senior Fitness Test (SFT) battery were examined to establish the predictive validity of the Chinese CHAMPS-Q. The SFT was first developed and validated by Rikli and Jones for the early identification of older people at risk of losing functionality.¹⁶ The rationales behind the SFT as well as the validity and reliability of its testing items are thoroughly described in the SFT Manual.¹⁶ Four fitness dimensions including the following six fitness tests were used in this study: the 30s arm curl test and 30s chair stand test for muscle strength of upper and lower extremities, respectively; the back scratch test and the chair sit and reach test for upper and lower body flexibility, respectively; the 8 ft up and go test for dynamic balance and agility; and the 2min step test for aerobic endurance. Each test was strictly conducted according to the Senior Fitness Test Manual (2nd version).¹⁶

Data analysis

Descriptive data were reported as mean, standard deviation and percentages. All the outcomes from Chinese CHAMPS-Q were used for reliability analysis. They are the energy expenditure (kcal/wk), frequency (session/wk), and duration (min/wk) of MVPA and PA. A two-way mixed model (single measure) intraclass correlation coefficient (ICC) with 95% confidence intervals (CIs) was applied for test-retest reliability analysis. An ICC of less than 0.40, 0.40–0.75, and greater than 0.75 represent poor, moderate, and excellent reliability, respectively.¹⁷ For validity analysis, the non-parametric Spearman's rank-order correlation coefficients (ρ) were calculated to assess the relationships among outcomes from the Chinese CHAMPS-Q, accelerometer and physical fitness. The Chinese CHAMPS-Q outcomes at T1 were adopted in these analyses with the purpose to avoid the potential influence of wearing the accelerometer on physical activities. A p -value of less than 0.05 was considered statistically significant. All data analyses were performed using the Statistical Package for the Social Sciences, version 24.0 (SPSS Statistical Software, Chicago, IL, USA).

Results

Demographic description of participants

Among the 110 qualified participants, 6 older adults reported more than 5 missing data and 3 older adults could not attend the test due to time conflict ($n = 1$) or physical discomfort ($n = 2$). Finally, 101 participants completed the Chinese CHAMPS-Q. Of the 101 participants, six older adults failed to wear the accelerometer for consecutive 7 days, and therefore 95 older adults were available for the accelerometer data. Female participants took a large part of the sample (65.3%), which is a common phenomenon in related studies.^{6,11–13} Over one-third of the sample was identified with hypertension. Most of the participants (67%) made a positive response about self-perceived health status. Table 2 displays the demographic information of the 101 participants.

Reliability test

Table 3 presents the basic descriptive statistics and correlations of the CHAMPS-Q outcomes at the two tests with 7-day apart. The

ICC coefficients ranged between 0.72 and 0.96 in all CHAMPS-Q outcomes ($p < .05$), indicating excellent test-retest reliability of the Chinese CHAMPS-Q. Energy expenditure for a week showed relatively lower ICC coefficients (ICC = 0.72–0.89, $p < .05$), while the frequency per week demonstrated highest test-retest agreement (ICC = 0.92–0.96, $p < .05$).

Validity test

Table 4 presented the Spearman's correlation in outcomes between Chinese CHAMPS-Q and accelerometer. Overall, the weekly energy expenditure and duration in PA significantly correlated with all accelerometer outcomes ($\rho = 0.22–0.31$, $p < .05$). Of which, the energy expenditure ($\rho = 0.31$) and duration ($\rho = 0.30$) in PA as reported from the CHAMPS-Q demonstrated higher correlation coefficients with those measured in the same metric using an accelerometer. Regarding the measures related to MVPA in CHAMPS-Q, only the duration showed a significant correlation with the PA duration from the accelerometer ($\rho = 0.21$, $p < .05$). No significant correlations were observed in other outcomes between Chinese CHAMPS-Q and accelerometer.

The predictive validity of the Chinese CHAMPS-Q was assessed by comparing the CHAMPS-Q outcomes with physical fitness in terms of muscle strength, flexibility, agility and aerobic endurance. All the outcomes from the CHAMPS-Q showed significant correlations with muscle strength of upper extremities ($\rho = 0.22–0.34$, $p < .05$). The weekly energy expenditure, frequency and duration of MVPA as well as the frequency of PA showed a significant correlation with muscle strength of lower extremities ($\rho = 0.23–0.27$, $p < .05$). In addition, there was significant relationship between frequency of MVPA and aerobic endurance ($\rho = .29$, $p < .05$). No other significant correlations were found between the outcomes of Chinese CHAMPS-Q and physical fitness. See Table 5 for more detailed information.

Discussion

This is the first study to modify the CHAMPS-Q to suit Chinese older adults and to examine the measurement properties of the Chinese CHAMPS-Q. Results from this study demonstrated excellent test-retest reliability and modest but acceptable construct and predictive validities of the Chinese CHAMPS-Q in assessing physical activity among older adults.

Instead of asking to recall PA of a typical week last month, this study required older adults to report PA of a typical week RECENTLY (i.e., '这段时间以来' in simplified Chinese). This has been found to reduce the time spent to complete the questionnaire in the pre-test. As all the participants reported, they had to define the time boundary of last month before each question. This would inevitably bring pressure to the recalling process and result in psychological resistance. The time slot of 'a typical week recently' would ease such kind of tension and reflect the actual activities occurred often. However, these are the phenomena the researchers found during the test and the subjective feelings reported by participants in the pre-test. Whether statistically significant differences exist in PA by the two different time definitions still needs further study. Besides, some participants have difficulties when recalling the total duration of an activity in a week. As they asked, why not reporting the single time duration of each activity since there was a question for the weekly frequency of each activity? This could be taken into consideration for the future studies in refining the CHAMPS-Q.

This study is in line with the related studies that the CHAMPS-Q has excellent test-retest reliability, especially in the dimension of weekly frequency.^{18,19} However, the ICC values revealed in this study were entirely higher when comparing to other related

studies examining the reliability of CHAMPS-Q in different samples.¹⁸ This could be due to the clear instructions made before the test and the repeated cueing during the test process,² and such an effect could be more evident in inactive or sedentary older adults. According to the feedback from the pre-test, all the possible queries about the Chinese CHAMPS-Q were marked down and explained to the participants before the formal test. Consequently, all the participants should have known the question items in the Chinese CHAMPS-Q very well. The research assistant was asked to provide help during the test process and check for the completeness. The on-site research assistant would be a positive signal motivating the participants to complete the questionnaire carefully.¹⁹ To some extent, replacing activities occurred in a typical week 'last month' by those over a typical week 'recently' could also influence the test-retest reliability. Just as Prochaska and his colleagues found in their study, questionnaire reliability was increased by asking participants to report their activities based on the average score of two different periods – over a typical week and the past seven days.²⁰ More research, therefore, is needed to discuss in-depth such underlying mechanisms.

This study revealed low to moderate correlation coefficients for the construct validity of the Chinese CHAMPS-Q, which is in line with those using the accelerometer as the comparison measures ($\rho = 0.20–0.40$).^{12,18,21} However, no significant correlations were found between frequency and those accelerometer outcomes. Referring to the previous studies, various comparison measures have been used to examine the construct validity of the CHAMPS-Q, including but not limited to accelerometers, pedometers, physical fitness, physiology indicators, and self-perceived health.^{6,18,19,21–24} In addition, studies using the accelerometer as the comparison measures have rarely reported the correlations between frequency and objective PA measures.^{12,19,22} This would thus limit the interpretation of the present frequency results with related studies. Meanwhile, some studies adopted the fitness parameters to validate the CHAMPS-Q, and they reported positive correlations between PA frequency and physical fitness.^{6,11,12} Despite this, no analysis was needed to make here since the measurement properties of accelerometry data and physical fitness differentiated each other inherently. As suggested by Chinapaw and his colleagues,²⁵ physical fitness should not be used to validate the PA questionnaire since there are two different constructs. In this respect, future studies should take these logistics and interpret appropriately.

With the hypothesis that people at higher physical activity level would have better performance on physical fitness,²³ Rikli has recommended using fitness as indirect indicators of PA questionnaires validity, especially in older adults.² As previously stated, physical fitness having different PA construct would not be a proper measure to examine the construct validity of the PA questionnaire. Hence, the validity as indicated by Rikli shall refer to the predictive validity, and this study used the fitness parameters to examine the predictive validity of the Chinese CHAMPS-Q, which is echoing previous studies.¹¹ In the present study, all the outcomes as measured by the CHAMPS-Q (i.e., energy expenditure, duration, and frequency) significantly correlated with 30s arm curl test, indicating that muscle strength of upper extremities would be a sensitive factor to habitual PA levels in the targeted group. To our best knowledge, only one prior study has taken upper body strength as one of the validation measures to examine the CHAMPS-Q.²⁴ Conversely, lower body functioning is the most-used fitness parameter in CHAMPS-Q validity studies, but no consensus has been made on their relations in terms of statistical significance.^{11,12,24} In this study, MVPA outcomes from the CHAMPS-Q significantly associated with muscle strength of lower extremities, while the PA energy expenditure and duration did not. Except

for MVPA frequency and aerobic endurance, non-significant correlations showed between CHAMPS-Q outcomes and flexibility, aerobic endurance and agility, respectively. Due to sampling variations in both demographic and clinical characteristics as well as different assessments used, discrepancies are indeed evident in these correlations between fitness components and CHAMPS-Q outcomes.^{11,12,23,24} Therefore, the suitability of physical fitness as a validity measure for the CHAMPS-Q again worthy of more comprehensive study.

This study has two main limitations that compromise the generalization of results. All the participants were recruited from Nanjing, a well-developed city located in the Yangtze Rive Delta megaregion of China. By 2017, Nanjing had more than seven million residents, and nearly 15% were those over 65 years old. Moreover, the older population is increasing at a rate of 4–5% per year. All these make Nanjing to be an aged-society. Since China is a big country with a vast territory and a large population, older adults living in different areas would have different PA habits. For example, older adults who come from the countryside would have less chance to play tennis, and those from northern west China could not do swimming related sports conveniently. Therefore, from the viewpoint of enhancing item response, future studies should check the suitability of PA items and refine any whenever applying the Chinese CHAMPS-Q into the local older population. As stated above, all the participants completed the CHAMPS-Q with the research assistant on-site to provide help; this somewhat increases the answering accuracy and questionnaire completeness. Future studies should take it into mind when running the comparisons with this study.

Conclusion

This study adds important information in measuring Chinese older adults' physical activity, and provide evidence-based information for the measurement properties of Chinese CHAMPS. Findings from this study are consistent with those reported previously, and it can be concluded that the Chinese CHAMPS-Q has excellent test-retest reliability and acceptable construct and predictive validity in assessing physical activity of Chinese older adults.

CRedit authorship contribution statement

Yanan Zhao: Conceptualization, Investigation, Data curation, Writing - original draft, Supervision, Funding acquisition, Writing - review & editing. **Qianwen Wang:** Investigation, Data curation, Writing - original draft. **Pak-Kwong Chung:** Data curation, Writing - review & editing. **Keshu Cai:** Investigation.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesf.2020.07.002>.

Table 1
Substitution Activities to Suit Chinese Older Adults.

Item No.	Original activity (MET)	Substitution activity (MET)	Reason for substitution
#9	Play golf, carrying or pulling your equipment (count walking time only) (3.0)	Play badminton (4.0)	Golf is not a general activity applied to Chinese older adults' daily life. Instead, badminton and baby care are the two frequently reported activities during the pre-test.
#10	Play golf, riding a cart (count walking time only) (2.0)	Standing, play with the child (ren) (2.0)	Most Chinese families do not have gardens.
#21	Do heavy gardening (such as spading, raking) (4.0)	Play table tennis (4.0)	
#23	Work on your car, truck, lawnmower, or other machinery (3.0)	Work on your car, electric motor car, bicycle or other machinery (3.0).	Electric motor car and bicycle would be more prevalent in Chinese older adults.
#25	Walk uphill or hike uphill (count only uphill part) (6.0)	Weight-bearing walking (e.g., carrying 10 kg bags or baby) upstairs (6.0)	It is quite confused for older adults to remember the time spent in the uphill part of hiking. Therefore, it is changed to weight-bearing walk with bags or baby around 10 kg.
#30	Do other aerobic machines such as rowing, or step machines (do not count treadmill or stationary cycle) (5.0)	Do other aerobic machines in the community such as rowing, or step machines (do not count treadmill or stationary cycle) (5.0)	Almost communities have different kinds of public aerobic machines for leisure activity or exercise. Adding the "community" into the item would make it much clearer for older adults to understand the aerobic machines.
#31	Do water exercises (do not count other swimming) (3.0)	Childcare, standing (e.g., dressing, bathing, grooming, feeding, occasional lifting of a child) (3.0)	Water exercise, excluding swimming, is scarcely based on the researchers' experience in the previous studies and is confused to the participants of the survey according to the pre-test.

Table 2
Demographic Characteristics (N = 101).

Variables	Mean (or n)	SD (or %)
Male	35	34.7%
Age (yrs)	69.30	5.37
Weight (kg)	65	13.40
BMI(kg/m ²)	25	4.47
Resting blood pressure		
systolic BP	132.80	16.70
Diastolic BP	74.80	11.80
Hypertension	38	37.6%
Education level		
High or higher	46	45.5%
Secondary	35	34.7%
Primary	15	14.9%
Never attended school	5	5.0%
Self-reported health status		
Excellent	14	13.9%
Very good	27	26.7%
Good	27	26.7%
Fair	29	28.9%
Not good	4	4.0%
Independent-living	3	3.0%

Note: Hypertension = diastolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥90 mmHg.

Table 3
Test-retest Reliability Based on Intraclass Correlation Coefficients (ICC) and 95% Confidence Intervals (95%CI) (N = 101).

Variables	Test	Retest	ICC (95%CI)
Energy expenditure (kcal/wk)			
PA	5905 ± 3234	5530 ± 2865	.72 (.60–.81)*
MVPA	3036 ± 2632	3254 ± 3475	.89 (.83–.92)*
Frequency (sessions/wk)			
PA	40.50 ± 17.20	39 ± 16.30	.92 (.88–.95)*
MVPA	16.20 ± 11.60	15.70 ± 11.10	.96 (.94–.97)*
Duration (hrs/wk)			
PA	28.50 ± 12.80	28.20 ± 14.90	.92 (.89–.95)*
MVPA	11.20 ± 9.37	11.60 ± 11.40	.90 (.92–.97)*

Note: MVPA = Moderate-to-vigorous physical activity; *p < .05.

Table 4
Construct Validity of the Chinese CHAMPS-Q against Accelerometer (n = 95).

CHAMPS-C	Accelerometer			
	Energy expenditure (kcal/wk)	Duration (hrs/wk)	Steps (no./wk)	MVPA duration (hrs/wk)
PA				
Energy expenditure (kcal/wk)	.31*	.27*	.24*	.22*
Frequency (sessions/wk)	.01	.07	.14	.09
Duration (hrs/wk)	.22*	.30*	.24*	.28*
MVPA				
Energy expenditure (kcal/wk)	.16	.18	.12	.11
Frequency (sessions/wk)	.08	.08	.14	.03
Duration (hrs/wk)	.09	.21*	.37	.14

Note: PA = Physical Activity, MVPA = Moderate to Vigorous Physical Activity; *p < .05.

Table 5
Predictive Validity of the Chinese CHAMPS-Q against Physical Fitness (n = 95).

CHAMPS-C	Physical Fitness					
	AC	CS	BS	SR	UG	Step
PA						
Energy expenditure (kcal/wk)	.27*	.12	.14	.06	.04	.05
Frequency (sessions/wk)	.26*	.27*	.04	.13	.08	.10
Duration (hrs/wk)	.26*	.15	.01	.14	.12	.05
MVPA						
Energy expenditure (kcal/wk)	.22*	.23*	.16	.04	.01	.19
Frequency (sessions/wk)	.34*	.36*	.04	.18	.21	.29*
Duration (hrs/wk)	.27*	.27*	.09	.11	.01	.23

Note: PA = Physical Activity, MVPA = Moderate to Vigorous Physical Activity. AC = 30s Arm Curl test, CS = 30s Chair Stand test, BS = Back Scratch test, SR = Chair Sit and Reach test, UG = 8 ft Up and Go test, Step = 2min Step test; *p < .05.

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