Validity and Reliability of the Modified Thai Adolescent's Physical Activity Questionnaire

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Abstract : This study sought to determine the validity and reliability of a self-report instrument, the Modified Thai Adolescent's Physical Activity Questionnaire (MTAPAQ). Concurrent validity was assessed using 40 secondary school Thai adolescents (17 males and 23 females), who wore an ActiGraph accelerometer, during their waking hours for seven consecutive days. The students completed the MTAPAQ upon completion of the recording period. Reliability was evaluated using 30 secondary school Thai adolescents (12 males and 18 females) who completed the MTAPAQ by recalling their physical activities during the previous seven days, on two separate occasions that were three days apart.

A significant correlation was found between the Metabolic Equivalent of Tasks (MET-mins), as determined by the MTAPAQ, and log (10) transformed activity counts, as determined by the ActiGraph accelerometer. The test-retest reliability, of the two administrations of the MTAPAQ, was found to be significant. The findings provide evidence of an acceptable level of concurrent validity and test-retest reliability of the MTAPAQ for use with Thai adolescents.

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Introduction

A number of questionnaires have been translated or modified from their original English version, into Thai, and used to measure physical activity.[1-3] However, most scales that have been translated and/or modified to measure physical activity originally were developed to assess adults. Even though the Thai Adolescent's Physical Activity

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Questionnaire (TAPAQ),[4] a 7-day physical activity recall questionnaire, has been used throughout Thailand to assess the physical activity of adolescents, its concurrent validity against an objective measure (accelerometer) has been found to be low.[4] Thus, no valid questionnaire exists to assess the physical activity of adolescents in Thailand. Therefore, the purpose of this research was to provide a valid and reliable instrument to measure physical activity of Thai adolescents by modifying the TAPAQ and, subsequently, testing its validity and reliability.

Review of literature

Assessment of the physical activity of children and adolescents has included a variety of measures that can be categorized into either objective methods (i.e. direct observation, indirect calorimetry, doubly-labeled water, pedometers, accelerometers, and heart rate monitoring) or subjective methods (i.e. questionnaires and activity diaries).[5-7] Due to the fact that objective methods are recognized as being time and cost consuming,[5-7] the most common means of gaining information regarding daily physical activity from a large group of subjects, such as children and adolescents, is through use of a subjective measure, such as a physical activity questionnaire.[8] This especially is true when one is seeking low cost and easily disseminated means of collecting daily physical activity data.

Through use of a physical activity recall questionnaire, subjects can be asked to recall information about their physical activity during a specific period in the recent past (i.e. 1, 3 or 7 days, or 1 month) to determine the frequency, duration and/or type of physical activity in which they have participated.[5] Due to the fact that accuracy of self-report data may be questioned, subjects need to be able to: comprehend the directions given; recall past events; and, report information with little bias.[9] In addition, it has been recommended that physical activity questionnaires be validated, prior to use, against an objective method, such as direct observation, indirect calorimetry, doubly-labeled water, accelerometer, pedometer or heart rate monitor.[6]

The TAPAQ measures five domains of activity. [4] Domain I measures games and free-play activities that involve sitting activities, such as arts and crafts, watching television, doing jigsaw puzzles, playing music, playing board games and fishing. Domain II measures games and free-play activities that involve movement, including: hide-and-seek, kite-flying, *Kra-tai- kha-deaw (กระต่ายขาเดียว), Wing-peaw (วิ่งเปี้ยว), Ti-chap (ตี่จับ), and Toey (เตย).* Domain III measures physical exercises, such as running, rope jumping, standing and jumping, calisthenics, and cycling. Domain IV measures sports, such as badminton, football, volleyball, tennis, basketball and swimming. Domain V measures household physical activities, including: house cleaning, washing clothes, ironing, washing dishes, washing cars and gardening.

The concurrent validity and test-retest reliability of the TAPAQ has been tested by 175 high school students, from 5 high schools in Bangkok and Nakhon Patom province, Thailand, wearing an

ActiGraph accelerometer (CSA model 7164), during waking hours (except when bathing or involved in water activities), for seven consecutive days.[4] During the monitoring period, subjects reportedly were contacted by phone and reminded to wear the ActiGraph accelerometer. After the initial recording time (TAPAQ1), and removal of the ActiGraph accelerometer, subjects were asked to complete the TAPAQ for the previous seven days. Subjects also completed the questionnaire 1 to 3 days later (TAPAQ2). Results revealed, with respect to concurrent validity, no significant correlation between the ActiGraph accelerometer activity counts and total metabolic equivalent of task (MET-mins) value (frequency x duration x MET value for each kind of physical activity during the previous seven days summed across all activities). When duration of physical activity was eliminated, from the calculation, the correlation between the ActiGraph accelerometer activity counts and the MET-mins value (summation of the frequency performed for each kind of physical activity during the previous seven days x its MET value) between TAPAQ1 and TAPAQ2 improved. However, the correlation coefficient was low ($r = .27$; $p = .002$). With respect to test-retest reliability of the TAPAQ, the intra-class correlation between TAPAQ1 and TAPAQ2 was reported to be 0.72 ($p < .001$).

The lack of validity found, regarding the TAPAQ, may have been due to the fact that some activities (standing and jumping) that required different energy expenditures were grouped together in the same domain. For example, standing on one leg (mild stretching exercise) was equal to 2.5 METS, while high jumping or long jumping was equal to 6 METS.[10] In addition, some activities (walking and transportation physical activity) that children and adolescents perform daily were not included in the TAPAQ.

Thus, in an attempt to develop a valid and reliable instrument to measure the physical activity of children and adolescents, the TAPAQ was modified to increase its validity. As shown in **Table 1**, modifications included: adding walking and transportation physical activity; separating exercises that involve standing (standing on one leg, stretching both arms to both sides while standing on one leg, and kicking while standing) from exercises that involve jumping (high jump and long jump); separating sedentary behaviors, (watching television and using computer) from other activities that involve sitting activity (playing music and doing jigsaw puzzles); and, adding activities that involve sitting quietly (listening to music, watching a movie in a theater, and reading/doing homework). Following modification of the TAPAQ, the validity and reliability of the Modified Thai Adolescent's Physical Activity Questionnaire (MTAPAQ) was tested.

Method

A cross-sectional design was used to evaluate the validity and reliability of the MTAPAQ. After approval of the study was granted by the Research Ethics Committee of the Faculty of Nursing, Prince of Songkla University and the directors of the

Table 1 Example items of the Modified Thai Adolescent's Physical Activity Questionnaire

Activity	Frequency (day)	Duration per day
1. Activities that involved sitting quietly		
○ Watching TV	.....day	.....hr. .....min.
○		
2. Games and free-plays that involved sitting (such as arts and crafts, chess, jigsaw puzzles,.....)	.....day	.....hr. .....min.
3. Games and free-plays that involve movement or unstructured outdoor play (such as *Wing-peaw,* hide-and-seek, ...)	.....day	.....hr. .....min.
4. Exercises		
○ Exercise that involve jumping (such as rope jumping, Jumping Jack, ...)	.....day	.....hr. .....min.
○		
5. Walking	.....day	.....hr. .....min.
6. Sport		
○ Badminton	.....day	.....hr. .....min.
○		
7. Household activity		
○ Doing the laundry (such as ironing, hanging out washing, ...)	.....day	.....hr. .....min.
○		
8. Transportation physical activity		
○ Walking to or from school	.....day	.....hr. .....min.
○ Cycling to or from school	.....day	.....hr. .....min.

selected schools involved in the study, data were collected over a 3-month period. For the validity section of the study, one public and one private secondary school were selected because of proximity to each other, since the primary investigator (PI) had to download data from the accelerometers each weekday.

Potential participants included all school students in the selected secondary schools. The students were approached by the primary investigator (PI), in groups of 2-5 students, outside their classrooms before and after school time, shown an ActiGraph

accelerometer and informed about: the nature of the study; their rights regarding confidentiality and anonymity; their right to withdraw without repercussion; and, the exclusion criteria. They were excluded if they privately told the PI they were receiving treatment or medication for weight reduction, diagnosed with delayed development or had a serious or chronic illness. Those who verbally agreed to participate were given an assent form, as well as a parental consent form, that explained the nature of the study, as well as the children's rights regarding confidentiality and anonymity, and right to refuse or withdraw from the study without negative repercussions. The students were asked to hand deliver both the signed assent and parental consent forms to the PI.

For the reliability section of the study, a convenience sample was selected from one class of students in the public secondary school. All students in the class were informed about the study in the same manner as those in the validity portion of the study and invited to participate. An assent form, as well as a parental consent form, containing the same information in the consent form for the validity portion of the study, was given to each student willing to participate. The students were asked to return the forms to the class representative the following Monday, so they had sufficient time to get their parents, especially those who did not live with their parents, to sign the consent form.

Two groups of southern Thai students (7^{th} to 12^{th} graders) were selected using nonprobability sampling from one public and one private secondary school. A total of 56 students (7^{th} to 12^{th} grade students) from both schools (12 from public secondary school and 44 from private school) were originally recruited for the validity portion of the study, while thirty-three 11^{th} grade students originally were recruited from the public school for the reliability component of the study. Three of the 11^{th} graders were used in both the reliability and validity portion of the study. However, due to incomplete information obtained during data collection, only data from 40 students (6 from public secondary school and 34 from private school) were analyzed for the validity portion of the study and data from 30 students were analyzed for the reliability portion of the study (see **Table 2**). Of the 56 participants in the validity portion of the study, 14 (25%) did not adhere to the instructions or terminated use of the accelerometer before the end of the study and 2 (3.6%) did not return the questionnaire within two days after the recording period. For the reliability portion of the study, 3 (9.1%) participants did not complete the questionnaire at the second round. No significant gender difference was found between those with complete and incomplete data (Pearson's chi-square = 2.81; df = 1; p = 0.09 for the validity portion of the study and Fisher's exact test = 0.00; df = 1; p = 1.00 for the reliability portion of the study).

As shown in **Table 2**, the 40 students taking part in the validity portion of the study were 12 to 18 years of age (mean age = 14.77, SD = 1.18), while the 30 students in the reliability component of the study were 15 to 17 years of age (mean = 16.62 years, SD = 0.44. The majority (validity = 57.5%; reliability = 60%), in both portions of the

Table 2 Participants' demographic characteristics

Variables		Validity component (n = 40)		Reliability component (n = 30)	
		Frequency (n)	Percent	Frequency (n)	Percent
Gender	Male	17	42.50	12	40.00
	Female	23	57.50	18	60.00
School grade	7	3	7.50		
	8	2	5.00		
	9	24	60.00		
	10	3	7.50		
	11	7	17.50	30	100.00
	12	1	2.50		
Religion	Buddhism	39	97.50	30	100.00
	Islam	1	2.50		
Mother's occupation	Housewife	1	2.50	5	16.67
	Companyemployee	1	2.50	2	6.66
	Government official	29	72.50	12	40.00
	Farmer	1	2.50		
	Business owner	8	20.00	11	36.67
Father's occupation	Company employee	1	2.50	2	6.66
	Government official	6	15.00	14	46.67
	Business owner	27	67.50	14	46.67
	Missing	6	15.00		

study, were female. Although, the majority (60%), in the validity portion of the study, were in the 9th grade, all (100%) in the reliability portion of the study were in the 11th grade.

Instruments

Three instruments were used in the study: a researcher developed Demographic Data Sheet, the Modified Thai Adolescent's Physical Activity Questionnaire (MTAPAQ); and, the ActiGraph Accelerometer (CSA model 7164, FL).[11] The

Demographic Data Sheet obtained information the students provided regarding their: age, gender, type of school (public or private), grade in school, religion, mother's occupation and father's occupation.

The Modified Thai Adolescent's Physical Activity Questionnaire (MTAPAQ) is a 7-day recall questionnaire that was modified by the PI from the original TAPAQ[4] after approval was obtained from the original authors. Subjects were asked to respond to 37 items that were divided into seven groups of physical activities (32 total items) and one group of sedentary activities (5 items). The seven groups of physical activities included: activities that involved sitting (n = 1); games and free-play that involved movement (n = 1); physical exercises (n = 6); walking (n = 1); sports (n = 15); household activities (n = 6); and, transportation activities (n = 2). The sedentary activities included: watching television, using a computer, listening to music, watching a movie in a theater, and reading/ doing homework. Respondents were asked to recall the number of days they performed each activity (frequency) and the length of time (duration) they were involved daily in each activity during the previous seven days. The respondents recorded the frequency of the specific physical activity in days, and the duration of the activity in hours and minutes. In addition, respondents were asked to record the amount of time they "actually" were active, and to not include the amount of time they were resting or waiting to participate in each given activity.

The volume or energy cost (energy expenditure expressed as Metabolic Equivalent of Tasks [MET]) of physical activity, was calculated using Ainsworth and colleagues' standardized method.[10] Activities listed in the questionnaire were based on MET values in the compendium of energy expenditures for youth developed by Ridley and colleagues.[12] The physical activities were converted to MET-minutes (MET-mins) by multiplying the MET value of activity times the frequency of activity times the duration of activity in minutes (MET X Frequency X Duration in minutes). Then the calculated values of all activities were summed to represent the volume or energy cost of total physical activity of each subject over a given time. Higher values of MET-mins indicated higher volumes of physical activity. For example, to calculate the total physical activity of an individual who played badminton (moderate effort) for 45 minutes once a week, Ridley and colleagues'[12] standard value of 4.5 MET was assigned. The frequency of the activity was one day per week, while the duration of activity was 45 minutes. Thus, by multiplying 4.5 MET X 1 day X 45minutes, the total physical activity expended was determined to be 202.5 MET-mins.

Depending on whether a given activity can be divided into various components, each of the components of an activity may be recognized as having a different MET value.[10, 12] For example, walking has various components each of which has a different MET value. Some of the components and their respective MET values are: walking from a house to a car or a bus, (2.5 MET); walking for pleasure (3.5 MET); and, walking for exercise (3.8 MET).[10] The various components of an

activity, such as walking, also may require different amounts of energy expenditure to accomplish. For example, simply walking versus carrying a load while walking require differing amounts of energy expenditure. Thus, the effort required to conduct a given activity may be considered light, moderate or vigorous, depending on whether one walks slow, fast or very fast. [12] However, since the MTAPAQ did not identify the subject's walking speed nor level of effort, walking, in this study, was categorized as requiring moderate effort and considered to have a MET value of 3.6 MET.

Some MTAPAQ activities, due to being peculiar to Thailand, such as petanque, chair ball, Thai games (i.e. Wing-peaw) and free-play, were not assigned a MET value designated by Ridley and colleagues[12] or by Ainsworth and colleagues.[10] Rather the PI assigned MET values for the activities by rating them as being similar to an activity with a standard MET value and, thereby, gave the respective activity a similar MET value. For example: petanque was assigned the same MET value as bowling; chair ball was assigned the same MET value as basketball; and, Thai games and free-play were assigned the same MET value as unstructured outdoor play.

The ActiGraph Accelerometer [11] is a physical activity monitor designed to measure the quantity, duration and intensity of body movement. The accelerometer is used to: measure physical activity in one dimension (vertical), two dimensions (vertical and medio-lateral) or three dimensions (vertical, medio-lateral and anterior-posterior); [5-7] detect intermittent activity patterns; and, store continuous data over extended periods. The accelerometer has been recognized as a practical and useful tool to use to validate other physical activity assessment methods.[5, 7]

In this study, the Computer Science Application (CSA model 7164, FL) ActiGraph was used to measure physical activity of Thai adolescents, since it is designed to assess the magnitude of vertical acceleration of the body during movement. Activity counts were the summation of the accelerations measured during the monitoring period, higher counts indicating higher levels of physical activity. The log of activity counts from the ActiGraph was used to validate the self-report of physical activity from the MTAPAQ.

Procedure

After assenting and consenting, respectively, 56 secondary school students and their respective parents were given written instructions regarding how the students were to wear the ActiGraph accelerometer [in a pouch on their waist (over the right hip), during their waking hours (at least 10 hours a day), except when bathing or time spent in water activities, for seven consecutive days]. Consistent and correct placement of the accelerometer was emphasized in the instructions. Furthermore, subjects were asked to call the PI if the internal flashing light-emitting diode (LED) was not visible through the accelerometer translucent case.

Throughout the monitoring period, subjects were contacted daily, via cell phone message, to remind them to wear the accelerometer. To prevent

monitoring failure or monitoring loss, data were downloaded from the accelerometers daily, except on weekends and holidays. Subjects were instructed to recommence the monitoring process whenever they experienced a monitoring failure or forgot to wear the accelerometer. Those who failed to adhere to the monitoring instructions were excluded from data analysis.

Upon completion of their monitoring period and removal of the accelerometer, subjects were asked to complete the MTAPAQ, which was disturbed to them the last evening of their monitoring, unless their monitoring ended Sunday night, in which case the MTAPAQ was disturbed Monday morning. In addition, they were asked to hand return everything to the PI within two days. All returned MTAPAQs were checked, by the PI, immediately upon return for completeness and response discrepancies, as well as validated, with each participant, regarding the information provided. For example, those who gave frequency and duration the same rating on more than one activity were asked to clarify what they performed. Data were analyzed only from those who wore the accelerometer for seven consecutive days and completed the questionnaire.

For the reliability testing component of the study, instructions regarding how to complete the MTAPAQ were revised due to the fact that two subjects in the validity section of the study rated the same number for frequency and duration, on more than one activity, while participating in only one type of sport. The revisions included the addition of rating frequency and duration examples, i.e. if one played basketball he/she needed to rate only the frequency and duration for playing the game, and not the frequency and duration of the running and jumping involved in playing basketball. In addition, a description of walking was added to the walking component of the questionnaire because subjects in the validity portion of the study thought walking meant only the walking done for exercise and, thus, did not rate their frequency and duration of this activity. Walking, therefore, was defined as including all kinds of walking performed during the previous seven days, i.e. walking before, during and after school, as well as walking for exercise, but did not include walking done to and from school.

Thirty-three 11^{th} graders then were asked to respond to the revised MTAPAQ on two separate occasions, three days apart. After the PI distributed the questionnaire, verbally explained and read, to the students, the instructions for completing the questionnaire, they were asked to complete the questionnaire, during a scheduled class period at their school, by recalling the physical activities participated in during the previous seven days. The completed questionnaires were collected by the PI and checked immediately in the classroom for discrepancies in responses, as well as validated using the same process as in the validity portion of the study. Data were analyzed only from those who completed the questionnaire on both occasions.

Data Analysis

Demographic data were analyzed using descriptive statistics. To test the strength of the relationship between physical activity, as determined by the MTAPAQ (MET-mins), and activity counts from the accelerometer, a Pearson's correlation coefficient was calculated. Using Pearson's correlations coefficient, test-retest reliability of the MTAPAQ was evaluated by correlating scores from the two instrument administrations that were separated by three days.

Results

Validity of the MTAPAQ: As shown in **Table 3,** activity counts were found to be skewed (skewness = 1.42, S.E. = 0.37; kurtosis = 2.22, S.E. = 0.73). Thus, log (10) transformation was used before subsequent analysis. Descriptive data of physical activity (MET-mins) and activity counts were found to be significant (r = 0.59; p = 0.01).

***Reliability of the MTAPAQ*:** As shown in Table 3, total volume of physical activity (MET-mins) from the first administration of the instrument (MTAPAQ1) did not demonstrate a normal distribution (skewness = 1.08, S.E. = 0.43; kurtosis = 1.91, S.E. = 0.83) and, thus, required log (10) transformation before subsequent analysis. The correlation between MET-mins for both administrations of the instruments (MTAPAQ1 & MTAPAQ2) was found to be significant (r = 0.76; p = 0.01). If sedentary behavior was eliminated from the calculation, the total volume of physical activity (MET-mins) from MTAPAQ1 was determined to be positively skewed (skewness = 1.18, S.E. = 0.43; kurtosis = 2.09, S.E. = 0.83) and required log (10) transformation for subsequent analysis. The correlation coefficient between MET-mins from the MTAPAQ1, without sedentary behavior, and the MTAPAQ2, without sedentary behavior, was found to be significant (r = 0.84; p = 0.01).

Discussion

The results from this study provided evidence of moderate validity for the MTAPAQ in assessing physical activity in Thai adolescents. The concurrent validity of the MTAPAQ against the accelerometer readings was higher than that found in the original TAPAQ.[4] Several explanations exist that help to address this difference. First, the TAPAQ missed information related to walking and transportation physical activity. All participants, in the present study, reported walking daily during their monitoring period. However, the frequency and duration of walking varied across students. Fifteen (37.5%) of the participants performed transportation physical activity, and yielded a large number of activity counts. Adding both activities, walking and transportation physical activity, into the questionnaire increased the accuracy of self-report physical activity. Standing and jumping also were categorized into the same dimension in the TAPAQ. Because standing and jumping do not have the same MET value, they were categorized separately in the MTAPAQ. Finally the questionnaires were checked for discrepancies and information was validated with each participant.

Table 3 Descriptive data of the metabolic equivalent of tasks (MET-mins) and activity counts

Variables	Min	Max	Mean	SD	Skewness	SE	Kurtosis	SE
MET-mins from MTAPAQ (validity study)	4812.50	16611.00	9665.87	2866.32	.28	.37	-.32	.73
Activity counts (validity study)	998873.00	4621318.00	1975898.00	776897.10	1.42	.37	2.22	.73
MET-mins from MTAPAQ1 (reliability study)	2677.50	22289.00	8781.44	4242.56	1.08	.43	1.91	.83
MET-mins from MTAPAQ2 (reliability study)	2685.00	11396.00	7651.80	2421.82	-.38	.43	-.84	.83
MET-mins from MTAPAQ1 (without sedentary behavior, reliability study)	1607.00	18272.00	6136.06	3772.45	1.18	.43	2.09	.83
MET-mins from MTAPAQ2 (without sedentary behavior, reliability study)	1404.00	10626.00	5334.22	2450.73	.15	.43	-.74	.83

MTAPAQ = Modified Thai Adolescent's Physical Activity Questionnaire; MTAPAQ1 = First administration of the Modified Thai Adolescent's Physical Activity Questionnaire; MTAPAQ2 = Second administration of the Modified Thai Adolescent's Physical Activity Questionnaire; Min = Minimum; Max = Maximum; SD = Standard Deviation; SE = Standard Error

Strength of association between self-report physical activity and objectively assessed physical activity among the participants was similar or stronger than that found in other populations. For example, Ekelund and colleagues[13] found moderate criterion-related validity ($r = 0.49$; $p < 0.001$) of the questionnaire using accelerometer activity counts (MTI ActiGraph, Fort Walton Beach, FL) as the criterion with Swedish youths. The concurrent validity of the MTAPAQ also was similar to that noted among American adolescents, where an association (rho = 0.56, $p < .05$) was found between total physical activity obtained from the "Physical Activity Questionnaire for Adolescents" and activity counts from the ActiGraph activity monitor (model 7164, Fort Walton Beach, FL).[14] In addition, the present study showed higher concurrent validity than Wong and colleagues'[15] study when they examined, using Canadian 6th-12th grade students ($r = 0.59$; $p = 0.01$ vs. rho = 0.44; $p < .01$), the correlation between self-reported and accelerometer-measured average daily time spent performing moderate to vigorous physical activity.

Compared to a modified version of the "International Physical Activity Questionnaire" (MIPAQ) used with Vietnamese adolescents,[16] the results of the present study provided a higher validity value. However, with the MIPAQ, participants had to judge whether the physical activity they performed was light, moderate or vigorous. Thus the MIPAQ may have asked questions that were difficult to answer, resulting in the questionnaire's low concurrent validity.

The MTAPAQ had an acceptable level of reliability for a newly developed instrument. The test-retest reliability was close to findings regarding the original TAPAQ.[4] By comparison, participants, in this study, completed the MTAPAQ on two separate occasions, three days apart, whereas all participants in Kijboonchoo and associates[4] study completed the questionnaire one to three days apart.

Results of the current study suggested test-retest reliability of the questionnaire was higher than other questionnaires for adolescents.[15,16] Wong and colleagues[15] reported, Canadian students (grades 9-12 aged 16 ± 1.6 years), provided moderate agreement (weighted kappa = .58) for a one week test-retest reliability for physical activity levels (inactive, moderately active, active) assessed by the "SHAPES Physical Activity Questionnaire." Compared to the IPAQ that was modified and used with Vietnamese adolescents,[16] the MTAPAQ had a higher reliability coefficient. In addition, Lachat and colleagues[16] examined the test-retest reliability of the IPAQ over a two-week period and found a lower correlation coefficient (rho = 0.45; $p < .05$).

Limitations and Recommendations

Like all studies, this study has limitations. Participants may have misinterpreted the categories of activities, i.e. considered running and jumping, when they played basketball, as two separate physical activities. However, because these two activities occurred simultaneously, the questionnaire counted them as a single entry. They also may have thought walking meant walking for exercise, rather than walking as part of daily activities. Thus, they may have underestimated the amount of walking they did over a seven-day period. Even though they had to estimate the duration, per day, they performed each activity, they may have estimated the duration to be the overall duration for each activity over the entire seven day period. In addition, since the instrument required recall and was self-report, the PI had to rely on the honesty and memory of the participants.

When using the MTAPAQ in future studies, researchers need to clearly inform the participants how the physical activities are to be counted, what is meant by walking as a physical activity and how to determine the duration of each activity on a daily basis. In addition, it may behoove researchers to meet with each participant to confirm the recorded values are accurate. Although this would require additional time, and somewhat diminishes the value of a self-report questionnaire, it may help to assure the recorded data are correct. Since the MTAPAQ was used with adolescents, making the questionnaire more esthetically pleasing to the age group, by adding age appropriate pictures and printing the

questionnaire on colored paper, may increase the completion rate. Finally, to provide better evidence of validity and reliability, the MTAPAQ needs to be tested on a larger, more geographically diverse population.

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ความตรงและความเที่ยงของแบบสอบถามการเคลื่อนไหวร่างกายในวัยรุ่นไทย

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บทคัดย่อ: การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อประเมินความตรงและความเที่ยงของแบบสอบถามการเคลื่อนไหวร่างกายในวัยรุ่นไทย นักเรียนมัธยมจำนวน 40 คน (ชาย 17 คน หญิง 23 คน) ติดเครื่องวัดการเคลื่อนไหวร่างกายตั้งแต่ตื่นนอนจนกระทั่งเข้านอน ติดต่อกันเป็นเวลา 7 วัน หลังจากนั้นตอบแบบสอบถามการเคลื่อนไหวร่างกายในวัยรุ่นไทยเพื่อการประเมินความตรงตามเกณฑ์ของแบบสอบถาม นักเรียนมัธยม จำนวน 30 คน (ชาย 12 คน หญิง 18 คน) ตอบแบบสอบถามเกี่ยวกับกิจกรรมการเคลื่อนไหวร่างกายที่ทำในช่วง 7 วันที่ผ่านมา 2 ครั้ง ห่างกัน 3 วัน เพื่อประเมินความเที่ยงของแบบสอบถาม

การเคลื่อนไหวร่างกายที่วัดโดยแบบสอบถามมีความสัมพันธ์อย่างมีนัยสำคัญกับการเคลื่อนไหวร่างกายที่วัดโดยเครื่องวัดการเคลื่อนไหวร่างกาย จากการหาค่าความเที่ยงของแบบสอบถามการเคลื่อนไหวร่างกายในวัยรุ่นไทยโดยใช้วิธีการวัดซ้ำพบว่ามีความสัมพันธ์กันอย่างมีนัยสำคัญ ผลการศึกษาครั้งนี้พบว่าแบบสอบถามการเคลื่อนไหวร่างกายในวัยรุ่นไทยมีค่าความตรงตามเกณฑ์และความเที่ยงในระดับที่ยอมรับได้

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คำสำคัญ: วัยรุ่นไทย, แบบสอบถามวัดการเคลื่อนไหวร่างกาย, ความเที่ยง, ความตรง

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