

# The Relationship between Motivation for Physical Activity and Level of Physical Activity over Time

Keyvan Molanorouzi, Selina Khoo, Tony Morris

**Abstract**—In recent years, there has been a decline in physical activity among adults. Motivation has been shown to be a crucial factor in maintaining physical activity. The purpose of this study was to whether PA motives measured by the Physical Activity and Leisure Motivation Scale PALMS predicted the actual amount of PA at a later time to provide evidence for the construct validity of the PALMS. A quantitative, cross-sectional descriptive research design was employed. The Demographic Form, PALMS, and International Physical Activity Questionnaire Short form (IPAQ-S) questionnaires were used to assess motives and amount for physical activity in adults on two occasions. A sample of 489 male undergraduate students aged 18 to 25 years (mean  $\pm$ SD; 22.30 $\pm$ 8.13 years) took part in the study. Participants were divided into three types of activities, namely exercise, racquet sport, and team sports and female participants only took part in one type of activity, namely team sports. After 14 weeks, all 489 undergraduate students who had filled in the initial questionnaire (Occasion 1) received the questionnaire via email (Occasion 2). Of the 489 students, 378 males emailed back the completed questionnaire. The results showed that not only were pertinent sub-scales of PALMS positively related to amount of physical activity, but separate regression analyses showed the positive predictive effect of PALMS motives for amount of physical activity for each type of physical activity among participants. This study supported the construct validity of the PALMS by showing that the motives measured by PALMS did predict amount of PA. This information can be obtained to match people with specific sport or activity which in turn could potentially promote longer adherence to the specific activity.

**Keywords**—Physical activity, motivation, the level of physical activity, types of physical activities.

## I. INTRODUCTION

PA is defined as any movements carried out by the skeletal muscles that require energy above the basal metabolic rate [1]. Exercise is a sub-category of PA that incorporates planned, structured, and repetitive movements. Sport is another sub-category of PA, which includes structured competitive situations that are governed by rules [2]. Most researchers have focused on examining motivation in competitive sport [3] or adopted measures of motivation developed for competitive sport [4]. Others have examined exercise and developed measures of motivation for that context [5]. There is a need to validate measures of motivation

that can be applied to non-competitive PA, including organized exercise and informal leisure activities, as well as competitive sport, so that researchers examining reasons for participation in PA can study the full range of activities with the same measure, thus, facilitating comparison. Here we refer to PA except when discussing research that focused on sport or exercise.

In one of the few studies on PA motivation, Morris et al. [6] examined five types of activities for PA participation: team sports (lacrosse, netball, basketball, volleyball), individual sports (gymnastics, swimming), racquet sports (tennis, table tennis, squash), exercise activities (aerobics, weight training), and martial arts (karate, tae kwon do, taiji). They measured motives for participation using a modified version of the Participation Motivation Questionnaire (PMQ). Morris, Clayton, Power and Han [6] applied discriminant function analysis (DFA) to determine the motives that distinguished each type of activity from the rest of the sample. Results showed that team sports participants were discriminated from all the other participants by higher scores on the social or affiliation sub-scale of the PMQ. Racquet sports competitors were discriminated by higher scores than the rest of the sample on the challenge or competition/ego sub-scale. Exercise participants were discriminated by higher scores on physical condition than participants in other activities. Morris, Clayton, Power and Han [6] also found that martial arts competitors were discriminated by higher scores on enhancing body and mind-related skills than the rest of the sample.

Motivation may play a vital role in increasing and maintaining PA levels. Understanding the different motives in PA participation may provide valuable information to recreation providers who want to encourage and even increase the level of PA among their population. Due to the changing demographics and generational characteristics of adults, it is important to continue to track reasons why people participate in the different type of PA and use this information to help drive health programming.

This study collected data on two occasions. The aim of present study was to examine whether the motives are related to how much PA people do and also whether PA motives predicted the actual amount of PA at a later time.

## II. MATERIALS AND METHODS

Participation in the study was voluntary, and all participants provided written consent to participate in the study. A sample of 489 males undergraduate students aged 18 to 25 years (mean  $\pm$  SD; 22.30  $\pm$  8.13 years) took part in the study. They completed questionnaires on two occasions, 14 weeks apart.

K. M. is with the Young Researchers and Elite Club, Islamshahr Branch, Islamic Azad University, Islamshahr, Iran (phone: 00989123047457; fax: 00982156131394; e-mail: keivannorouzy@gmail.com).

S. K. is the Sports Centre, University of Malaya, Kuala Lumpur, Malaysia (e-mail: selinakhoo@gmail.com).

T. M. is with the Institute of Sport, Exercise and Active Living (ISEAL), College of Sport and Exercise Science, Victoria University, Melbourne, Australia (e-mail: Tony.Morris@vu.edu.au).

They were recruited from over 12 fitness and sports facilities at the University of Malaya. Participants reported that their main PA was football, futsal, basketball, volleyball, badminton, table tennis, tennis, gym, jogging, swimming, running or walking. These were categorised into three types of activities, namely exercise, racquet sport, and team sports. After 14 weeks, all 640 undergraduate students who had filled in the initial questionnaire (Occasion 1) received the two questionnaires via email (Occasion 2). Of the 493 students, 378 males emailed back the completed questionnaires.

### III. MEASURES

**Demographics Form.** Participants reported their level of study (undergraduate or postgraduate), year of study, gender, and age. Also, students provided their cell phone numbers and e-mail addresses so that the questionnaires could be distributed appropriately for the next step data collection.

**Physical Activity and Leisure Motivation Scale (PALMS).** The 40-item PALMS assesses the same eight motives for participation in PA as the REMM. It was developed as a short form of the REMM by selecting the five items with the strongest psychometrics on each of the eight sub-scales. Responses to the PALMS are made on the same 5-point Likert scales as used with the REMM. The range of each PALMS sub-scale is 5 to 25 because each sub-scale has five items [7].

**International Physical Activity Questionnaire Short form (IPAQ-S)** [8]. The IPAQ-S is designed to assess PA among adults. It was developed to be used among individuals aged 15 to 69 years [9]. The IPAQ-S is relatively easy to administer and can be filled out in less than 5 minutes. The IPAQ-S is used to record PA undertaken in the last seven days [10].

### IV. PROCEDURE

Participants were recruited from various fitness and sports facilities at the University of Malaya from September 2013 to January 2014. Participants completed the Demographic Form, the PALMS, and the IPAQ-S on two occasions, 14 weeks apart. Participants who took part in sports and PA at the beginning of the semester were invited to participate in the study (Occasion 1). All participants read the participant information sheets. They were then given the opportunity to ask any questions about the study. Their participation was voluntary. Those who agreed to participate completed the Demographic Form, PALMS, and IPAQ-S questionnaires on the first occasion at the start of the academic semester.

### V. RESULTS

METs on Occasion 2 had a strong positive correlation with affiliation and mastery on Occasion 1, a moderate positive relationship with enjoyment and competition, weak positive relationships with physical condition, appearance, and psychological condition, and a very weak positive relationship with others' expectations (Table I).

METs on Occasion 2 had a strong positive correlation with competition/ego and mastery on Occasion 1, a moderate positive relationship with enjoyment, and weak positive

relationship with affiliation, physical condition, appearance, psychological condition, and others' expectation. The meaningful effect size/correlations were competition, mastery, and enjoyment (Table II).

TABLE I  
PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN THE 8 SUB-SCALES OF PA MOTIVATION ON OCCASION 1 AND THE IPAQ-S SCORE (MET-MINUTES/WEEK) ON OCCASION 2 FOR MALE TEAM SPORT PLAYERS

		MA	EN	PS	PA	AP	OT	AF	CO
MET-minutes/week	r	0.71	0.39	0.28	0.29	0.29	0.17	0.73	0.46
	p	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: MA = mastery. EN = enjoyment. PS = psychological condition. PH = physical condition. AP = appearance. OT = others' expectation. AF = affiliation. CO = competition/ego.

TABLE II  
PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN THE 8 SUB-SCALES OF PA MOTIVATION ON OCCASION 1 AND THE IPAQ-S SCORE (MET-MINUTES/WEEK) ON OCCASION 2 FOR RACQUET SPORT PLAYERS

		MA	EN	PS	PA	AP	OT	AF	CO
M E T	r	0.64	0.45	0.27	0.26	0.29	0.25	0.27	0.65
	p	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: MA = mastery. EN = enjoyment. PS = psychological condition. PH = physical condition. AP = appearance. OT = others' expectation. AF = affiliation. CO = competition/ego.

METs on Occasion 2 had a strong positive correlation with physical condition and enjoyment on Occasion 1, a moderate positive relationship with psychological condition and appearance, and weak positive relationships with mastery, affiliation, and others' expectations, the meaningful effect size/correlations were physical condition, enjoyment, psychological condition, and appearance (Table III).

TABLE III  
PEARSON PRODUCT-MOMENT CORRELATIONS BETWEEN THE 8 SUB-SCALES OF PA MOTIVATION ON OCCASION 1 AND THE IPAQ-S SCORE (MET-MINUTES/WEEK) ON OCCASION 2 FOR EXERCISERS

		MA	EN	PS	PA
MET-minutes/week	r	0.281	0.672	0.691	0.472
	P	0.000	0.000	0.000	0.000
		AP	OT	AF	CO
	r	0.401	0.239	0.160	-0.071
	p	0.000	0.000	0.000	0.285

Note: MA = mastery. EN = enjoyment. PS = psychological condition. PH = physical condition. AP = appearance. OT = others' expectation. AF = affiliation. CO = competition/ego.

### VI. DISCUSSION

According to the tenets espoused within SDT [11], specific motives will predict the amount of PA people do [12]. This is because the behaviour is driven by motivation. People do the behaviours that they are motivated to do [13]. Thus, motives that are high will lead to more of the behaviour related to those motives, in this study PA. SDT predicts that more autonomous motives for a particular behaviour will result in increased levels of that behaviour, and there is extensive research to support this prediction. Intrinsic and identified motives have been linked with increased exercise participation [14] and higher levels of PA [15].

Firstly, this study found that amount of PA related by mastery, enjoyment, affiliation, and competition among male team sports players. These results support and extend research by Kaupuzs [12] and Cox, Smith and Williams [16], which demonstrated that intrinsic motivation was more important than extrinsic motivation in increasing the amount of PA in adults. Further, consistent with the predictions of the present study, some sub-scales of PA motivation affected the amount of PA undertaken based on systematic differences in certain types of PA based previous research [3].

Secondly, for male racquet sports players' competition, mastery, and enjoyment were related by the amount of PA. These results are also consistent with past work [6]. This finding suggested that racquet sports competitors were discriminated by higher scores than the rest of the sample on the challenge or competition/ego sub-scale. Also, intrinsic motivation (mastery and enjoyment) was a more important motive for increasing amount of PA. This result supports past research that revealed that intrinsic motivation was a stronger predictor of long-term exercise adherence than extrinsic motivation [12].

Finally, for male exercisers the motives of physical condition, enjoyment, psychological condition, and appearance were related by METs. These results support and extend research by Kilpatrick, Hebert and Bartholomew [17], which demonstrated that exercise participants were motivated by extrinsic factors and focused on appearance, weight, and stress management.

It is important to acknowledge potential limitations that must be considered in the interpretation of the research data. First, the motives for participation in PA and the amount of PA were obtained from self-report questionnaires. It is acknowledged that self-report is not always reliable. It is possible when examining psychological variables like the motivation that people respond in socially desirable ways. Researchers have reported that self-report of physical activity can be distorted by memory as well as efforts to look good or please researchers [18]. Thus, the self-report method might overestimate the results of total PA. As in any questionnaire approach, the reports given were dependent on respondents' recollection and how attentive the participants may have been in their responses. Second, the sample was limited to university students, thereby restricting the potential to generalise the findings to other age groups and people with different educational backgrounds. Finally, the balance between samples in different types of PA was not equal because of sampling peculiarities.

In future, researchers should investigate other types of PA among different subgroups of the population. Also, findings of the present study suggest that type of PA is one of the most important variables associated with PA motives that should be investigated in future research along with demographic variables, such as age, gender, race, and country of origin or residence. Additionally, the findings suggest that there is a need to consider types of PA that were not included in the present study when selecting participants in future studies. For example, a type of PA that is increasing in popularity is

extreme sports. It would be interesting to examine whether participants in extreme sports show similar patterns of motivation to those in established physical activities or whether they have different primary motives. When considering other types of physical activity, a key issue for extension of the present research is whether those who possess the primary motives for those activities are also the people who do the largest amount of those types of PA. In future research, it would be helpful to include more stringent controls for the amount of physical activity or, better still, to use more direct measures of activity, such as monitoring techniques like pedometers or accelerometers. A 14-week period also may not be long enough to capture motives effects that will lead to changes in the amount of PA. Longer periods of time or monitoring periods would be valuable in future research across different stages of age and gender. To increase long-term effectiveness of PA interventions and create more successful health-promotion campaigns, it may be useful to identify multiple motives (intrinsic and extrinsic) in various variables, such as age, gender, and types of PA, that will support sustained PA in the maintenance phase of interventions and in daily life.

Because of the 14-week delay between measuring motives and testing amount of PA, results of the present study clearly show that primary participation motives for specific types of PA varied in predictable ways and those primary motives were associated with participation in larger amounts of PA, providing support for the construct validity of the PALMS as a measure of motives for participation in PA. The present study also provides evidence to support the idea that by identifying the specific motives that push people to be actively involved in PA, useful and precise information can be obtained to match people with particular types of sport or PA, which in turn could potentially promote longer adherence to the chosen activity.

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