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Original Research Article

Motivational Factors and Pedometer-Derived Leisure Time Physical Activity in Active Middle-Aged and Older Adults

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Abstract

Purpose: The physical activity recommendations set by the American College of Sports Medicine (ACSM) are not being met by a large majority of older American adults. This problem is concerning due to the negative correlation between physical inactivity and risk of chronic disease. Middle-aged to older adults are at an increased risk of mortality and morbidity due to their physical inactivity. This is a growing trend among middle-aged and older adults in the United States due to the numerous barriers which contribute to this trend. Therefore, the aim of the present study is to investigate motivational factors and the impact on leisure time physical activity in middle-aged to older adults. **Methods:** Twenty-four middle-aged to older adults (mean age 62.1 years of age ± 7.62) participated in this study. Each participant underwent an initial meeting where they completed a thirteen question survey on motivation and physical activity or were given an Omron pedometer, which they were instructed to wear for seven days. **Results:** A correlational analysis between task motivation and total step count showed no significant difference ($p < .05$). A second correlational analysis between task motivation and age showed no significant difference ($p < .05$). An independent T-test compared task motivation and gender and showed significant difference ($p < .05$). No significant differences were found between task motivation and dependent variables. **Conclusions:** This study found no significant values, however, results of this study led investigators to infer that task motivated individuals gravitate towards structured exercise programs. Fitness professionals can use this knowledge to further instruct their clients. More research needs to be completed on ego oriented individuals and their leisure time physical activity level.

Key Words: Task orientation and ego orientation, motivation, Omron pedometers

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Introduction

Due to the fact that only 5.5% of the U.S. middle-aged and older adult population meets aerobic and muscular strengthening activities suggested in the *2008 Physical Activity Guidelines for Americans*, it is evident that the prevalence of physical inactivity is a growing issue in middle aged and older adult[1-3]. It is key to know individuals motivation orientation to increase physical activity level throughout the lifespan. Several previous research studies such as Loustalot et al.[2], and Son, Kerstetter, and Mowen[4], have shown a strong correlation between motivational factors and their impact on leisure time physical activity (LTPA) in young adult and athletic populations. Minimal research has been completed examining the correlation of motivation orientation and LTPA in middle-aged and older adult populations. Due to the lack of research on older adults and motivation this study was created to further explore this topic. The lack of research along with the growing epidemic of obesity and decreasing rates of physical activity are reasons to investigate this population and their amount of LTPA.

Research by Beauchamp et al.[1] and Springer, Lamborn, and Pollard[5] inspected that exercise adherence in U.S. adults has an inverse relationship with age (i.e., as one ages physical activity level decreases). Since this is well-known in this discipline, this research is focused on motivation type potentially impacting strategies to overcome these barriers including lack of resources, preexisting injuries, lack of social support, and lack of transportation, among many others. Individuals do not have a high quality of exercise adherence because of the variables listed above[6]. With the current obesity epidemic in the U.S. partially caused by decreased energy expenditure from insufficient physical activity, it is important that research is focused on ways to modify this trend. From previous literature, it is evident that there are multiple barriers such as family commitments, lack of resources, preexisting injuries, and too little time that prevent individuals from meeting the *American College of Sports Medicine's (ACSM)* physical activity recommendations[7].

This study is significant because the results will allow us to understand what motivates specific populations to increase their LTPA. Another component of this study is to investigate different motivational tactics that exercise participants engage in. Fitness professionals can implement these results in order to motivate a diverse group of individuals to increase their physical activity. The purpose of this study was to compare between task and ego motivated individuals the amount of LTPA they partake in. These findings can be used in the future as a way to guide professionals to encourage their athletes or clients to partake in more leisure time physical activity. The null hypothesis of this study was there will be no differences between task and ego motivated participants and their level of LTPA engagement outside the

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Community Fitness Program. The alternative hypothesis of this study states that task motivated individuals will be more likely to engage in LTPA outside of the structured exercise program than do ego oriented people.

Methods

Participants

Approximately 25 to 30 middle-aged to older adults (62.1 ± 7.6 yrs) were recruited from the University of Wisconsin-Eau Claire's Community Fitness Program via a sign-up sheet at the opening ceremony event. Individuals who participated in this study were 50 percent female and 50 percent male. To be eligible for this study, participants needed to meet criteria of being physically active, meaning they met the *2008 Physical Activity American College of Sports Medicine (ACSM) guidelines* of participating in 150 minutes or more per week of moderate-to-vigorous physical activity[8]. Participants also needed to have at least a 75 percent attendance rate at Community Fitness Program over the five-week span of data collection to be included in this analysis. Upon screening for eligibility there was only one participant excluded from the study due to the age not falling under the middle-age to older adult categories.

The present study protocol was approved by the Institutional Review Board at the University of Wisconsin-Eau Claire. Informed consent was obtained from each participant prior to data collection. The cover letter and informed consent was thoroughly read to them including benefits of participating in this study, such as learning more about their motivation orientation and ways they can motivate others and how this applies to leisure time physical activity (LTPA). At this point, participants either agreed or disagreed to the procedures of this study and formalized their participation by signing and dating the informed consent.

Instrumentation

Omron Pedometer

Steeves et al.[9], and Dondzila, Swartz, Miller, Lenz, and Strath[10], both conducted studies examining the external validity and inter-rater reliability of Omron pedometers in measuring step counts. These studies compared Omron pedometers to Sportline Traq and Yamax SW200 free-living activity measuring devices, utilizing a variety of physical activities. Steeves et al.[9] found that Omron pedometers are valid and reliable for monitoring continuous walking. Results from the five trials of the *100-step track walk* concluded 100 percent accuracy when the Omron was worn on the waist. The results from these five trials were compared to the hand tally counter for validity and reliability. During this study, pedometers were positioned on the right hip of each participant to maintain consistency. Dondzila et al.[10] found that the mean error step scores during overground walking protocol was 1.9% in individuals 50 to 80 years of age during normal walking speed, as compared to other measurements on

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less than normal walking speed, and greater than normal walking speed, as well as a younger age group 20 to 49 years of age. The model of Omron pedometer used in this study was HJ-112, manufactured by Omron Healthcare Incorporation located in Verona Hills, Illinois. This model of Omron pedometer can accumulate up to seven days of step count data. The unit displays the total number of aerobic steps in a day that satisfies the following two conditions: walk more than sixty steps per minute, and walk for more than ten minutes continuously.

Physical Activity Motivation Survey

The *Task and Ego Orientation in Sport Questionnaire (TEOSQ)* was utilized in this study to decipher whether participants were Ego or Task oriented. This survey was created by Duda[11], and modified for this study to emphasize LTPA rather than sport performance. The questionnaire revisions include substituting "exercise" in place of "skill" and rephrasing the question "I feel most successful while working out when I" from "I feel most successful in competition when I." In addition, question nine was altered from "I score the most points" to "I perform the most reps." Duda provided initial internal consistency coefficients of 0.82 (task) and 0.89 (ego), and concurrent validity support through cross-survey analysis. Thus, this portion of the survey was deemed valid and reliable to measure task and ego motivations of the participants. Responses were evaluated based on a 5-point Likert scale with the anchoring's *strongly agree to strongly disagree*. Participants were asked to think of when they felt most successful while working out and to respond to 13 items indicative of task and ego orientation. For example, responding "strongly agree" to the item "I feel most successful while working out when I work really hard" is indicative of Task orientation, whereas responding "strongly agree" to the item "I feel most successful while working out when I'm the best" is indicative of Ego orientation.

Procedures

Data were collected twice a week for two hours over a period of five weeks. The initial meeting with each participant occurred in the Human Performance laboratory on campus during which participants reported to the Community Fitness Program. Upon signing the informed consent form, each participant was asked to either complete the 13 item questionnaire or was given an Omron pedometer to wear for the next seven days during waking hours.

Omron pedometers were reset via changing the batteries, and resetting each device before giving the device to each participant. Individuals were instructed to keep the device facing outward of the body and on the right hip to prevent reactivity. The screen was covered with the plastic clip, to prevent participants from increasing their normal physical activity level. To ensure the accuracy of each pedometer a safety apparatus was created and utilized to

properly position the pedometer on the right hip and secured during free-living physical activity. The order of completing the data collection process was randomly selected for each participant. Half completed the survey first, and the other half completed the free-living physical activity monitoring first. After the seven days of monitoring was complete, pedometer was retrieved, and step counts were obtained from the device for each day of the week.

Additionally, participants filled out the Physical Activity Motivation Survey, which is a modified version of the *Task and Ego Orientation in Sport Questionnaire (TEOSQ)* created by Duda[11]. Participants completed the survey individually to ensure there was no bias or pressure from others to alter their answers in a specific way. Researchers collected the surveys from each individual to ensure confidentiality. Each survey began with a demographics section including gender, age, and an identification number assigned to each participant. Identification numbers were assigned prior to participants completing the survey to guarantee privacy. During data analysis, each participant's Task and Ego orientation score was calculated using the following equations: (q represents specific questions on survey) Ego Orientation = (q1 + q3 + q4 + q6 + q9 + q11) ÷ 6, and Task Orientation = (q2 + q5 + q7 + q8 + q10 + q12 + q13) ÷ 7. After these two values were determined participants were divided into Task or Ego groups based on their higher score. Although participants may not be completely Task or Ego orientated, the higher value of the two equations determined which group they were assigned to. For example, MM1738 scored 2.3 ego and 4.6 task, therefore this participant would be considered more task orientated. In the event that there was a participant that scored exactly the same for Ego and Task orientations, a third group was formed.

Statistical analyses

This study utilized the Quasi-experimental design which measured pre-existing, individual motivation status. The dependent variable was current free-living physical activity level, measured as steps taken over a seven day period by pedometers. The independent variable was motivational orientation which was determined by the *Physical Activity Motivation Survey.* This study is cross-sectional meaning investigators observed a population of individuals at one point in time. The statistical method employed to help answer the research question is an independent t-test which used $p < .05$ as statistically significant. Data analysis used the software SPSS version 19.0 for this study.

Results

Motivational orientation was classified as task or ego orientated depending on the results from the survey. Based on the results from the survey, all of the participants were task oriented. Therefore, during the interpretation of the results, two correlation analyses were completed to

investigate task orientation further. Statistical analyses were completed using the Statistical Package for the Social Sciences (SPSS) version 19.0. First, investigators ran a correlation analysis between task orientation and free-living physical activity level. The second correlation analysis was between task orientation and age. Next, an independent t-test was completed to analyze the differences between task orientation and sex.

Task Motivation and Physical Activity

A Pearson Product Moment Correlation analysis revealed a low positive correlation between degree of task motivation and free-living physical activity measured by average weekly step count (r = .125, p = .560). Coefficient of determination indicated 1.6% of the variance in free-living physical activity could be explained by degree of task motivation.

Task Motivation and Age

A Pearson Product Moment Correlation analysis revealed there was no correlation between degree of task motivation and age (r = -.036, p = .866). Coefficient of determination indicated 0.13% of the variance in age could be explained by degree of task motivation.

Sex Comparison for Task Motivation

Using an alpha level of .05, the independent samples t test indicated the average degree of task motivation for males (M = 4.10; SD = .50; n = 10) was not significantly different than average degree of task motivation for females (M = 4.34; SD = .39; n = 14), $t(22)$ = -1.31, p = .258.

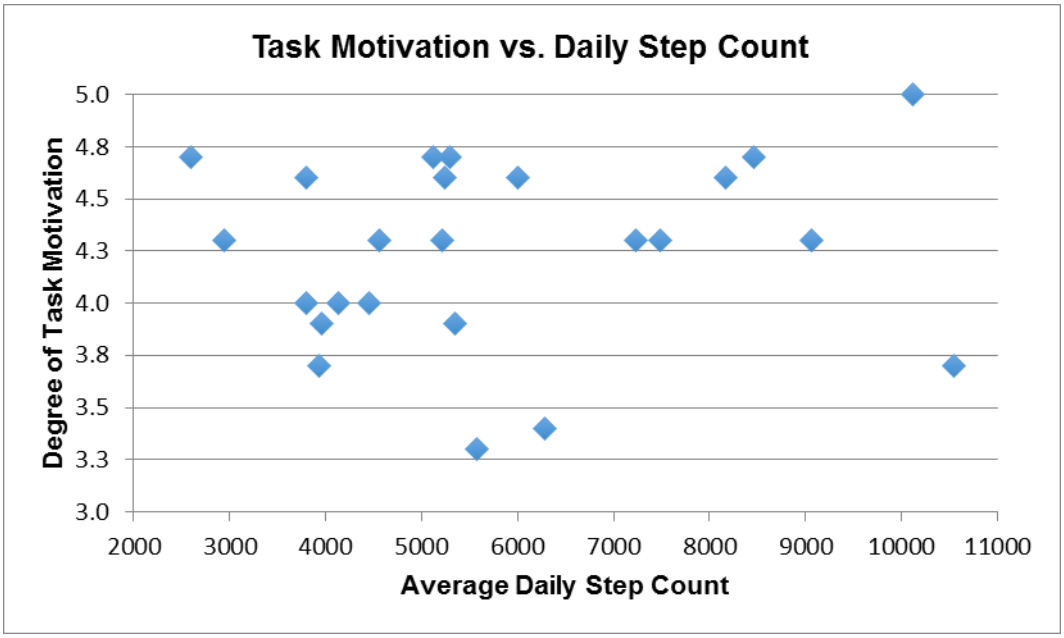

Figure 1. Correlation between task motivation and free-living physical activity measured by pedometry.

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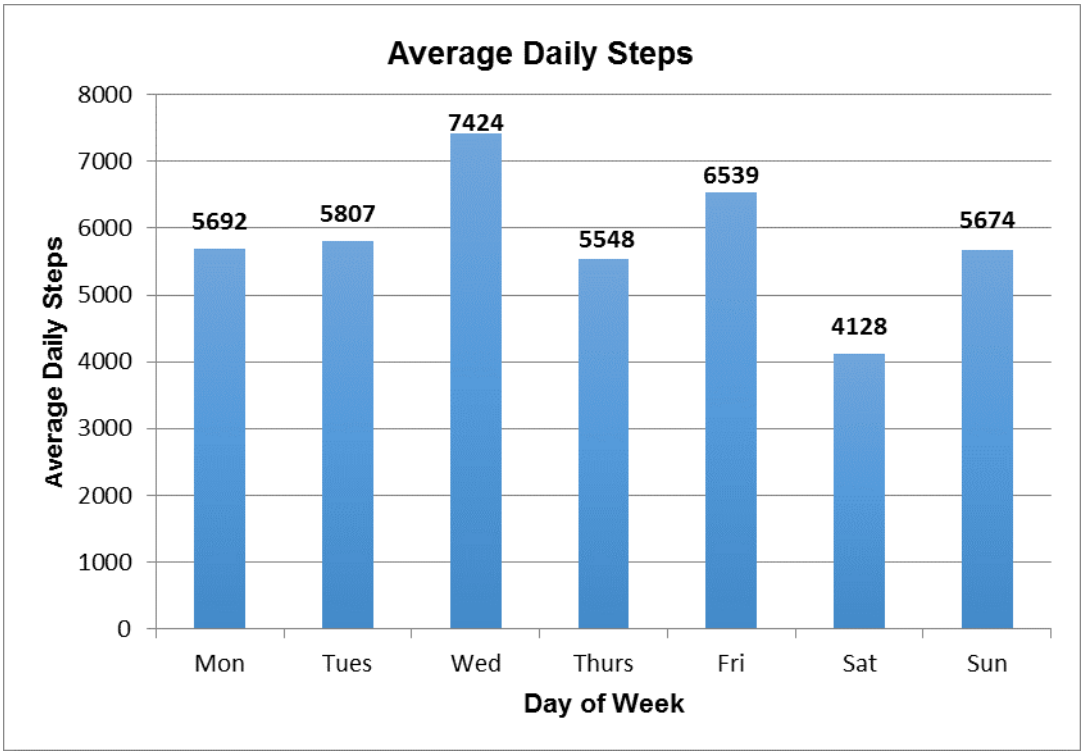

Figure 2. Correlation between task motivation and free-living physical activity measured by pedometry.

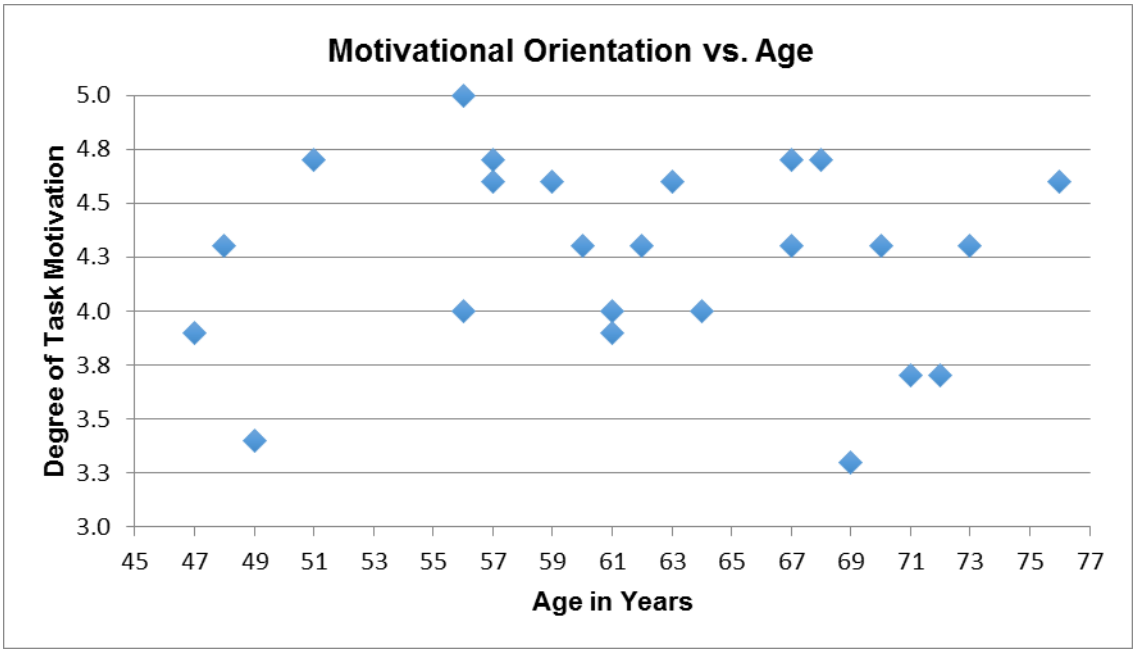

Figure 3. Correlation between task motivation and age.

Discussion

The purpose of this study was to determine if task motivated individuals are more likely to engage in leisure time physical activity outside of a structured exercise program compared to individuals that are ego orientated. Based on the survey results the investigators found that each participant was task orientated. Due to this our hypothesis was neither rejected nor supported therefore the task score was further analyzed. Areas that were explored was the relationship between task score and average step count, task score and age, and task score and sex.

This present study found that there was a low positive relationship between task orientation and free-living physical activity level measured in step count. The average step count was *M* = 5830; *SD* = 2179. Yli-Piipari, Kiuru, Jaakkola, Liukkonen, and Watt [12], conducted a study on task values and physical activity and found the results for both girls and boys showed that particularly intrinsic task value typical for the peer group predicted group members' physical activity. This article is significant because one of the main findings showed the higher task orientated an individual is, the higher the physical activity level they will have. These findings are consistent with the results of this study, showing that individuals who are task oriented generally engage in higher amounts of physical activity.

Based on the results of this study, we can infer that there is no relationship between age and task orientation. Participants' average age was *M* = 61.83; *SD* = 8.2 years. Wasenius et al.[13] piloted a study about structured exercise intervention on physical activity level in middle aged to older adults ages 40-65 years. They found structured exercise intervention did not increase the volume of total physical activity in this population. The findings from this article are different from this present study because structured exercise accounted only for a small portion of the total volume of physical activity. In contrast, in this study structured physical activity was a large portion of the total volume of physical activity. This is supported by the average step count measured by Omron pedometers. As shown in Figure 2, on average when participants attended the Community Fitness Program (i.e. MWF mornings), their step counts were significantly higher than on days when they were not in attendance.

There were no significant difference between males and females task scores. Males had a similar average task score (*M* = 4.10; *SD* = 0.50; *n* = 10) when compared to females (*M* = 4.34; *SD* = .39; *n* = 14). A study by Orsega-Smith et al.[6] showed determinants of activity may differ by sex. They stated older adult males are more internally motivated than females, whereas older females place more attention on the social aspect of activity than males. In general, older adults enjoy activities shared

with individuals who have similar physical capabilities and attitudes. In contrast, this study found there was no difference between men and women and their level of intrinsic motivation because all participants were task motivated.

Methodological considerations

There are numerous strengths to this study, including zero attrition rate, sufficient sample size, and no physical or mental risk to participants. In contrast, there were limitations to this study as well. For example, it was inconvenient for participants to wear the Omron pedometer during waking hours for one week, which may have decreased participant compliance to wearing the monitor during all waking hours. In addition, the original questionnaire developed by Duda[11] aimed to examine the task- vs. ego-orientation among athletes; thus, questions were strongly worded, which in the present middle-aged to older adults the wordings utilized may have made participants feel uncomfortable and may not have accurately assessed individuals' motivational orientation. In the future, researchers could revise this questionnaire based on a pilot study where a small sample size completed the survey and gave feedback to the investigators. Furthermore, future investigators could record participants' attendance to measure if they currently meet the ACSM Physical Activity Guidelines[8]. One methodological flaw that may have influenced the results could be experimental mortality, which is a threat to internal validity because this study did not account for the number of days participants' were absent from the Community Fitness Program. Another potential confound is the Halo effect. This applies to this study because none of our researchers have an extensive background in sports psychology and/or sports sociology. This could have caused participants' to have a cognitive bias towards their overall impression of the researchers' conducting this study.

Conclusion

During the course of this study, researchers found there were no ego oriented people in this study; therefore, the results of this study explored the correlation between the degree of task orientation and step counts, age, and investigated sex differences. Although the original hypothesis was altered, the study was still meaningful for fitness professionals. For example, task oriented people engage in more physical activity when participating in a structured exercise program. Also, these findings are applicable to strength and conditioning specialists who work with middle-aged to older adults. When designing workout programs for this population, they can take into account the findings of this study, and incorporate more task oriented motivational aspects. Future researchers should explore middle aged to older adult populations who are ego oriented to compare findings from this study. This

would give fitness professionals a better grasp on how to motivate both ego and task oriented people to increase their leisure time physical activity

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References

1. Beauchamp MR, Harden SM, Wolf SA, et al. (2015). GrOup based physical activity for older adults (GOAL) randomized controlled trial: study protocol. *BMC Public Health*, 15, 592-592.
2. Loustalot F, Carlson SA, Kruger J, Buchner DM, Fulton JE. (2013). Muscle-strengthening activities and participation among adults in the United States. *Res Q Exerc Sport,* 84, 30-38.
3. Mitchell MS, Goodman JM, Alter DA, et al. (2013). Financial incentives for exercise adherence in adults: Systematic review and meta-analysis. *Am J Prev Med,* 45, 658-667.
4. Son JS, Kerstetter DL, Mowen AJ. (2009). Illuminating identity and health in the constraint negotiation of leisure-time physical activity in mid to late life. *J Park Recreat Admi*, 27, 96-115.
5. Springer JB, Lamborn SD, Pollard DM. (2013). Maintaining physical activity over time: the importance of basic psychological need satisfaction in developing the physically active self. *Am J Health Promot*, 27, 284-293.
6. Orsega-Smith E, Getchell N, Neeld K, MacKenzie S. (2008). Teaming up for senior fitness: A group-based approach. *JOPERD*, 79, 39-44.
7. Pescatello LS. (2014). *ACSM's Guidelines for Exercise Testing and Prescription* (9th ed.). Baltimore, MD: Lippincott Williams & Wilkins.
8. ACSM | News Releases. (n.d.). Retrieved December 8, 2015, from https://www.acsm.org/about-acsm/media-room/news-releases/2011/08/01/acsm-aha-support-federal-physical-activity-guidelines
9. Steeves JA, Tyo BM, Connolly CP, Gregory DA, Stark NA, Bassett DA. (2011). Validity and reliability of the Omron HJ-303 Tn-Axial accelerometer-based pedometer. *J Phys Act Health*, 8, 1014-1020.
10. Dondzila CJ, Swartz AM, Miller NE, Lenz EK, Strath SJ. (2012). Accuracy of uploadable pedometers in laboratory, overground, and free-living conditions in young and older adults. *Int J Behav Nutr Phys Act*, 9, 143-149.
11. Duda JL. (1989). Relationship between task and ego orientation and the perceived purpose of sport among high school athletes. *JSEPsychology*, 11, 318-335.
12. Yli-Piipari S, Jaakkola T, Liukkonen J, Kiuru N, Watt A. (2011). The role of peer groups in male and female adolescents' task values and physical activity. *Psychol Rep*,108, 75-93.
13. Wasenius N, Venojärvi M, Manderoos S, et al. (2014). The effect of structured exercise intervention on intensity and volume of total physical activity. *J Sports Sci Med*, 13, 829-835.