HHS Public Access

Author manuscript

Scand J Med Sci Sports. Author manuscript; available in PMC 2015 August 01.

Published in final edited form as:

Scand J Med Sci Sports. 2014 August ; 24(4): 727–735. doi:10.1111/sms.12040.

Motives for Physical Activity among Active and Inactive Persons in Their Mid-Thirties

Sari Aaltonen[1], **Mirva Rottensteiner**[2], **Jaakko Kaprio**[3,4], and **Urho M Kujala**[5]

Sari Aaltonen: sari.s.aaltonen@jyu.fi

[1]M.Sc., PhD Student, Department of Health Sciences, PO Box 35, FIN-40014 University of Jyväskylä, Finland. Tel: +358 40805 3544, Fax: +358 14260 2001 [2]Department of Health Sciences, PO Box 35, FIN-40014 University of Jyväskylä, Finland [3]Department of Public Health, The Hjelt Institute, and Institute for Molecular Medicine, PO Box 41 (Mannerheimintie 172), University of Helsinki, FIN-00014 Helsinki, Finland [4]Department of Mental Health and Substance Abuse Services, National Institute for Health and Welfare, PO Box 30, FIN-00271 Helsinki, Finland [5]Department of Health Sciences, PO Box 35, FIN-40014 University of Jyväskylä, Finland

Abstract

The purpose of this study was to examine the motives for leisure time physical activity among active and inactive men and women in their mid-thirties. We used both cross-sectional and longitudinal designs. Altogether, 2308 participants (mean age 33.9 years, 53.4 % women) were identified from the population-based FinnTwin16 Cohort. Physically active and inactive individuals were identified on the basis of their leisure time MET hours/day. We evaluated participants' physical activity motivation with a modified version of the Recreational Exercise Motivation Measure. Comparisons between active and inactive individuals were analysed using the Wald test for equality of means, and effect sizes were calculated as Cohen's *d*. Motives related to mastery, physical fitness, social aspect of physical activity, psychological state, enjoyment, willingness to be fitter/look better than others and appearance were significantly more important for the active than inactive participants. Conforming to others' expectations was the only item on which the inactive persons scored higher than active persons. The longitudinal results for physical activity were parallel to the cross-sectional results. This study supports to the view that motivation factors differ between active and inactive persons, and that intrinsic motives are associated with consistent leisure time physical activity.

Keywords

intrinsic motivation; extrinsic motivation; exercise; leisure time physical activity; leisure time physical inactivity

INTRODUCTION

Consistent physical activity helps to maintain the physical functioning of the human body (Physical Activity Guidelines Advisory Committee, 2008), improves mental wellbeing (Paluska & Schwenk, 2000), and most of all reduces risks for chronic diseases (Morris et al., 1980; Paffenbarger et al., 1986; Physical Activity Guidelines Advisory Committee, 2008).

Given these widely published benefits, one would expect participation in physical activity to be the norm. Unfortunately, this is not the case.

Overall, increasing physical activity and the motivation for physical activity among people presents a major challenge. There is a huge variety of motivation levels between people starting from the people who have a lack of any kind of motivation to engage in any form of physical activity, and ending to the people who exercise for their inherent interest and enjoyment of the activity itself (Dacey et al., 2008). The self-determination theory (SDT) suggests that motivated behaviour is based on the satisfaction of three needs; competence, autonomy and relatedness (Deci & Ryan, 1985; Ryan et al., 2008). These needs form a continuum of internalization from externally regulated motives to intrinsically regulated motives. Extrinsic motivation leads us to perform to obtain rewards or outcomes that are separate from the behaviour itself (e.g. money, sanctions). Intrinsic motivation regulation is when the individual participates for the experience of the activity as pleasant, fun or satisfying (Deci & Ryan, 1985; Iso-Ahola & St. Clair, 2000; Dacey et al., 2008). Overall, SDT approach has been shown to be a relevant theory in the field of health care, providing a strong foundation for understanding the goals and motives for recreational exercise as well (Deci & Ryan, 2012; Teixeira et al., 2012). In this study, we define motivation as a psychological feature that arouses and energizes people to action toward a physical activity, and also makes them sustain a physically active behaviour. Motivation is a critical factor in physical activity, because increased motivation leads to increased participation in physical activity (Tsorbatzoudis et al., 2006). Enjoyment has been linked more strongly to sport participation than to physical activity overall, which also supports the association between intrinsic motives and consistent target-oriented physical activity (Kilpatrick et al., 2005).

Generally, people are driven to be physically active or inactive for a variety of reasons. An important factor motivating participation in physical activity, among all adult age groups, is health (Ashford et al., 1993; Kolt et al., 2004; Dacey et al., 2008; Murcia et al., 2008; Caglar et al., 2009). In addition to health benefits, appearance (Kilpatrick et al., 2005) and body image (Brudzynski & Ebben, 2010) are motives highly linked to physical activity among young adults. Some studies have examined differences in motivation factors between physically active and inactive persons. These studies are based on the hypothesis that the level of physical activity is explained by differences in motivation factors. It has been suggested that physical activity is mostly associated with environmental factors and inactivity with socio-demographic factors (Gordon-Larsen et al., 2000). Active older adults rated motivation factors relating to health and fitness, stress management, and enjoyment higher than their inactive counterparts (Dacey et al., 2008). Health, fitness, anxiety and stress release were also scored higher among physically active university teachers than physically inactive teachers (Reid & McGowan, 1986). A study with a unique design of twin pairs discordant for leisure time physical activity habits for 30 years supports these results. Significant differences in physical fitness and psychological state dimensions of motivation factors between active and inactive twin siblings were found (Aaltonen et al., 2012). Motives related to skill improvement also differed significantly between active and inactive co-twins. However, it is important to remember that motives may change during the stages of physical activity adoption (Frederick & Ryan, 1993). Changes in motivation may also be

due to exercise type (Ryan et al., 1997; de Andrade Bastos et al., 2006) gender, and primarily, age (Finkenberg et al., 1994; Gill et al., 1996; Dacey et al., 2008).

The aim of this study is to examine the motives for leisure time physical activity among active and inactive men and women in their mid-thirties. We use both cross-sectional and longitudinal designs, which give us opportunity to compare results of two designs as well. Motives have been widely studied, but to date little is known about differences in motives between active and inactive persons or about motives for physical activity in early adulthood. At this life stage common life-change events, such as changes in relationships and in family structures, are associated with changes in physical activity levels (Allender et al., 2008). We have earlier studied physical activity motives among older twin pairs discordant for leisure time physical activity. Now, we are interested in whether same phenomena are found among a younger and also larger population. Based on our earlier study (Aaltonen et al., 2012), we hypothesize that intrinsic motivation and enjoyment of physical activity are needed to induce people to be consistently physically active in long term also in early adulthood when several life-changes are present.

MATERIALS AND METHODS

Study cohort

The participants for this study were identified from the ongoing wave five of the FinnTwin16 Cohort, which is a longitudinal study of Finnish twins born between October 1974 and December 1979. Originally, the twins were identified from the Central Population Registry of Finland (Kaprio et al., 2002). The twin cohort, which was initiated in 1991, is a nationwide study of health behaviours in twins and their families. The questionnaires mailed to the cohort members included among others, items on body composition, physical activity, occupation, alcohol use and smoking. A purpose of the questionnaire was to obtain baseline data for longitudinal studies. The baseline assessment of all the twins was made within 60 days of their 16th birthdays. Twins were surveyed again at mean ages 17.1, 18.6, and 24.4, the fifth survey is still currently ongoing. All the persons of the consecutive birth cohorts (1974–1979) invited to participate in the survey, who have so far answered to the questionnaire, are included in the present analysis, with a response rate of 71.6%.

We included persons who answered the survey on monthly frequency, mean duration and mean intensity of their leisure time physical activity, the daily duration of commuting-related physical activity and their motives for engaging in physical activity (N=3 874). All the physical activity variables were based on structured questions. However, since pregnancy can reduce the ability to be physically active in women, pregnant women were excluded from the analysis (n=186). Participants were asked to indicate their perceptions of their current health, physical fitness, work-related physical activity and financial standing. They were also asked about the presence of chronic diseases. All the survey items were self-reported. The participants gave their informed consent, and the study was conducted according to the appropriate ethical standards and the Declaration of Helsinki and approved by the ethical committee of the Central Finland Hospital district.

Level of physical activity was based on leisure time physical activity. The main outcome was measured as leisure time MET hours/day. MET hours/day is a sum score expressing the metabolic equivalent of physical activity (intensity × duration × frequency). The calculation of MET hours/day has been described in the paper of Kujala et al., 1998. However, this was to some extent modified, because response alternatives of leisure time physical activity questions were slightly deviating in the present study although the questions were same. Physical activity during journeys to and from work was included in the calculation of leisure time MET hours/day.

Cross-sectional design

MET index (MET hours/day) was divided into tertiles: active persons, occasionally active persons, and inactive persons (N=3 688). In the analyses, we used the extremes of the distribution, namely active persons (N=1 202) and inactive persons (N=1 106). The MET index for active persons was > 5.3 MET hours/day and for inactive persons < 2.3 MET hours/day. Participant characteristics are shown in Table 1.

Longitudinal design

Additionally, we were also interested in the relationship between longitudinal physical activity habits and motivation factors. Although we had motivation data only from the ongoing wave five of the cohort, physical activity habits were available from wave four. Thus, MET hours/day was also analysed longitudinally. Despite of the fact that motivation factors were not available from both time points of the longitudinal design, the combination of different study designs gives us a unique opportunity to compare results of two designs. We had a mean 10-year follow-up time for physical activity, starting from the fourth survey time point (participants' mean age 24.4 years, SD 0.94 years) and ending at the ongoing fifth survey time point (participants' mean age 33.9 years, SD 1.19 years). At the baseline (wave four) we again formed age-specific MET index tertiles (active persons, occasionally active persons, and inactive persons) and including only the extremes in the analyses. Persons in the highest tertile were defined as active, i.e., at least 6.1 MET hours/day and persons in the lowest tertile were defined as inactive, i.e., less than 2.6 MET hours/day. Based on self-reported longitudinal physical activity habits for the last 10 years, we formed four groups; 1) those who were active at both baseline and follow-up (longitudinally active persons), 2) those who were active at baseline but were inactive at follow-up, 3) those who were inactive at baseline but were active at follow-up, and 4) those who were inactive at both baseline and follow-up (longitudinally inactive persons). First, we compared the longitudinally active (N=617) and inactive (N=532) persons, as we were interested in the motives of persons who have been consistently physically active or inactive. In addition, we studied whether those who had reported increased physical activity (changed from inactive to active) (N=238) differed from those who were longitudinally inactive.

Earlier analyses have shown high correlations between the leisure time physical activity questions we used and physical activity data obtained by interview (Waller et al., 2008). A detailed assessment of leisure time physical activity volume over the previous 12 months (12-month MET index) and a questionnaire-based leisure physical activity MET index

showed a good correlation (r=0.73, p<0.001, N=36) when the assessment and questionnaire were conducted at the same time point (Leskinen et al., 2009).

Motivation towards physical activity

In the present study, the motivational factors were collected from the fifth survey time point. To evaluate participants' physical activity motivation we used an 8-item questionnaire modified from the Recreational Exercise Motivation Measure (REMM) (Rogers & Morris, 2003). The REMM has been designed to measure adults' physical activity motivation. The original measure consists of 73 items, which represent eight larger sub-dimensions. Thus, the sub-dimensions consisted of 8 to 13 items. However, because the space available for the questions assessing motivation for physical activity in the present was restricted, we created only one item per the sub-dimensions to represent extensively the contents of the sub-dimensions. Obviously, this may have consequences for the validity and the reliability of the measure. The sub-dimensions of the measure were (the exact statements used in the questionnaire are shown in parentheses): 1) mastery ("improve my skills and/or get better at an activity"), 2) physical fitness ("be physically fit"), 3) affiliation ("be with friends and/or do activity with others"), 4) psychological state ("improve psychological health"), 5) appearance ("maintain/improve appearance and body shape"), 6) others' expectations ("conform to others' expectations"), 7) enjoyment ("have a good time and I enjoy exercising"), and 8) competition/ego ("be fitter and/or look better than others"). The sub-dimensions represent aspects of extrinsic motivation, except for mastery and enjoyment, which represent intrinsic motivation. This, therefore, fits well to a theoretical framework of the SDT. Specifically, affiliation, others' expectations, and competition/ego indicate social motives and appearance, and physical fitness and psychological state indicate body/mind motives. Participants were asked to rate each item on a 5-point Likert scale; 1= (*strongly disagree*), 5= (*strongly agree*). All the items were introduced by the stem "I want to…" or "I like (to)…". The developers of the REMM have validated the original 73-item measure (Rogers & Morris, 2003).

Statistical analyses

Data were analysed using IBM SPSS statistics 19.0 (IBM Corp. Armonk, NY, USA) and Stata version 12.0 (Stata Corp., College Station, TX). The normality of variables was assessed by the Kolmogorov-Smirnov test. When twins are analysed as individuals rather than as pairs, the observations and their error terms between members of a pair may be correlated. Hence, in all of our analyses we adjusted for twin clustering and used Wald test for equality of means to derive the proper values. Effect sizes were calculated as Cohen's d, the difference between means divided by the standard deviation. The level of significance was set at $p < 0.05$.

RESULTS

Relatively more women were physically inactive than men, and therefore the characteristics of the sample are presented by gender. There were no differences in height between active and inactive persons (Table 1). Active men had a lower body weight (p=0.003) and a lower body mass index (BMI) (p=0.002). The same was seen among women; active women had a

lower body weight ($p<0.001$), and lower BMI ($p<0.001$). Active persons were significantly more active in their leisure time than inactive persons (both men and women $p<0.001$), and they reported better subjective health status (both men and women $p<0.001$) and subjective physical fitness (both men and women $p<0.001$) than inactive ones. On the other hand, inactive persons reported significantly poorer financial standing (men $P = 0.002$, women $P < 0.001$) than active persons, and inactive men had significantly more chronic diseases ($p=0.007$) than active men.

Motivation factors for physical activity

Among both the active (N=1 202) and inactive (N=1 106) participants, the motive "be physically fit" was the most frequently reported motivation sub-dimension, followed by "improve psychological state". Next in order of frequency was the sub-dimension enjoyment of physical activity, followed by the sub-dimensions cultivation of skills and willingness to improve appearance and body shape, highlighted in particular by the active group. The active participants scored higher on all the motivation items except one, "conform to other peoples' expectations". The sub-dimension of conform to others' expectations was the least reported motivation sub-dimension among all participants. These findings were both in men and women (Figure 1).

When we compared all the active persons to the inactive persons, we found that the motivation sub-dimensions mastery ($P < 0.001$, Cohen's $d = 0.82$), physical fitness ($P < 0.001$, Cohen's $d = 0.49$), the social aspect of physical activity ($P < 0.001$, Cohen's $d = 0.52$), psychological state ($P < 0.001$, Cohen's $d = 0.51$), appearance ($P < 0.009$, Cohen's $d = 0.20$), and enjoyment ($P < 0.001$, Cohen's $d = 1.07$) were significantly more important for the active than inactive persons (Table 2). Also, willingness to be fitter or look better than others ($p<0.001$, Cohen's $d=0.28$) was highlighted significantly more by the active compared to inactive persons. Conforming to others' expectations was the only item that was more important (though not a statistically significant difference) for the inactive than active persons ($p=0.3$, Cohen's $d=-0.04$). The results of the separate-sex analysis were nearly identical to those for both sexes combined, and almost the same differences in all the items were found (Table 2). The results remained unchanged after excluding the participants with poor financial standing, with poor subjective health status or the participants who had one or more chronic disease.

Motivation factors for longitudinal physical activity

We also compared the longitudinally active persons to the longitudinally inactive persons. These results were parallel to the results of the cross-sectional study design: the motives related to all the sub-dimensions except one were significantly more important for the persons consistently active for the last decade than for those consistently inactive for the same amount of time (Table 3). Again, conforming to others' expectations was the only item more important for the longitudinally inactive than longitudinally active persons ($P = 0.01$, Cohen's $d = -0.16$). The separate-sex analysis did not substantially change the results (Table 3).

When we compared the persons who changed from inactive to active during follow-up time and those who were longitudinally inactive, the results of the motivation sub-dimensions changed slightly. In this analysis, the motivation sub-dimension of others' expectations (P = 0.47, Cohen's d = −0.06) did not differ significantly between the two groups (Table 4).

DISCUSSION

This study examined motives for leisure time physical activity among active and inactive persons in their mid-thirties. Motives related to seven of the eight sub-dimensions were significantly more important for the active than inactive persons. These sub-dimensions were physical fitness, psychological state, appearance, enjoyment, mastery, social aspect of physical activity, and willingness to be fitter or look better than others. In fact, conforming to others' expectations was the only item more important for the inactive than active persons. Fascinatingly, rather similar results were obtained when persons discordant for physical activity for the last 10 years were compared to those who were consistent in their physical activity over the same period.

In general, the same motivation factors were found to be important in the current study as in our earlier study among older twin pairs discordant for physical activity (Aaltonen et al., 2012). In both studies, the motivation factors most often cited were physical fitness, psychological state and enjoyment. Thus, the same factors seem to be important for engagement in leisure time physical activity for both younger and older adults in Finland. In addition, the results did not substantially differ by gender in the present study. These findings of the importance of physical and psychological health as motivation factors are also in agreement with earlier findings by other researchers. Basically, health seems to be the most important motivation factor, regardless of age, gender or level of physical activity, for participation in physical activity (Ashford et al.,1993; Kolt et al., 2004; Dacey et al., 2008; Murcia et al., 2008; Caglar et al., 2009). It is somewhat surprising that appearance was not noted as a leading motivation factor in this study, although previous studies have indicated that appearance and body image are linked to physical activity among younger adults (Kilpatrick et al., 2005; Brudzynski & Ebben, 2010).

When comparing the active and inactive persons, our study produced results which also corroborate the findings of the previous work in this field. Active persons have rated health, stress management and enjoyment as more meaningful motivation factors than inactive persons (Reid et al., 1986; Dacey et al., 2008; Aaltonen et al., 2012). In our study the same factors emerged, but with the addition that appearance, skill improvement, affiliation and competition were more important for the active than for inactive participants. As far as we know, the REMM motivation measure has been used in only one previous study of family members, who were dissimilar for leisure time physical activity. The earlier study (Aaltonen et al., 2012) was conducted among older twin pairs while the present study investigated younger persons. In the earlier study twin pairs were studied longitudinally, whereas in this study cross-sectional and shorter longitudinal designs were used. The twin design was not used in the present analysis; instead we contrasted individuals from the extremes of the distribution. Those in the extremes mostly came from different families, but within family correlatedness were adjusted for in the analysis. Once data collection in wave five is

completed later in 2012, we will look to see if we can identify sufficient numbers of physically active discordant pairs to replicate our earlier twin study on older adults (Aaltonen et al., 2012). The findings of the earlier and the current studies revealed the same trend. The difference between the results of existing studies may be partly explained by the participants and by the study design. Also, the motives for physical activity may be differently emphasized as people aged. Our longitudinal study indicated that environmental influences on leisure time physical activity increase with age, which may in turn influence motives (Aaltonen et al., 2010).

The inactive participants in the present study emphasized compliance with other peoples' expectations. This item of the motivation measure strongly represents the extrinsic type of motivation. Extrinsic motivation refers to motivation that comes from outside the individual. These rewards provide satisfaction and pleasure that the physical activity itself may not provide. Our findings corroborate the idea that chronically ill individuals who are often advised to increase their level of physical activity may consider external motives important. Also, while extrinsic motives may dominate during the early stages of physical activity adoption, intrinsic motives seem to be important for maintaining activity (Ryan et al., 1997; Ingledew et al., 1998; Buckworth et al., 2007). The REMM includes both the intrinsic and extrinsic aspects of motivation, and these aspects are shared by the SDT, the theoretical framework of the study, as well. Based on SDT, intrinsic motives are the ones which make people to be sufficiently interested in physically active life style, and value its outcomes enough to make it important in their lives (Teixeira et al., 2012). This is well linked to our results while both sub-dimensions of the REMM representing intrinsic motives, mastery and enjoyment, were significantly more important for the active than inactive persons. We compared the motives reported by those who remained inactive and those who changed from inactive to active during the 10 year follow-up period. The results also support the view that intrinsic motivation factors are needed to get people physically active, as those who increased their physical activity during the follow-up scored higher on intrinsic motivation factors at the follow-up measurement than those who were consistently inactive. Clinically, this is important information that needs to be taken into greater account in health education and in physical activity guidance. In short, counselling methods are needed which are able to change intrinsic motivation.

We estimated physical activity based on metabolic equivalent. However, for additional analyses, physical activeness and inactiveness were also estimated using the frequency, intensity and duration of physical activity (results not shown). No matter which estimator of physical activity was used, the same tendency to differences in motivation factors among the different groups of participants was seen. However, the difference in leisure time physical activity between active and inactive persons in this study may partly be explained by the fact that the inactive persons significantly more often had poorer financial standing than the active persons. It is obvious that poor economic situation can restrict a person's opportunities to be physically active in leisure time. Because chronic disease may also restrict the ability to engage in exercise, we excluded all persons reporting current chronic disease, but the results remained unchanged.

A key strength of the present study is the longitudinal design. Many previous studies have examined motives for engaging in physical activity, but few have compared motives between active and inactive persons. In addition, a further strength of the study is that the sample size was big enough to capture differences between the groups of active and inactive persons. The reliability and validity of the original REMM questionnaire and the Finnish version of the original measure has been demonstrated (Rogers & Morris, 2003; Pajunen, 2004), however, this has not been done for the modified version we used. The use of eight single item sub-dimensions instead of the original 73-item REMM questionnaire may limit validity and affect bias, although the single item sub-dimensions we used are the larger sub-dimensions of the original REMM questionnaire. Thus, the modified measure is very close to the original questionnaire, and it may be assumed that the validity of the measure we used may be a reasonable although it is not proven. Unfortunately, we were forced to use the modified version of the measure because the space available for the question was restricted by the multi-item online questionnaire we used. Furthermore, comparison between this study and those using the original and modified version of the REMM may be questionable. In fact, comparison between any of the motivation studies may be difficult because of the many differences in study designs. The differing results of motives for physical activity may partially be explained by different samples, e.g., age ranges of samples, the specific physical activity measurements used, and different definitions of physical activity, such as daily physical activity, leisure time physical activity, sports participation, and exercise participation. These definitions may assess slightly different aspects of self-chosen physical activity and, because, in particular, motives can differ by according to level of physical activity, may influence the study results.

In conclusion, the results of the present study revealed differences in motivation factors for leisure time physical activity between active and inactive persons in their mid-thirties. The active persons attributed greater importance to mastery, physical fitness, psychological state and appearance. Also, enjoyment, skill improvement, willingness to be fitter or look better than others and the social aspect of physical activity were more important for the active than inactive persons. In contrast, the sub-dimension conforming to others' expectations was more meaningful for the inactive persons than it was for the active persons. Parallel differences were observed when physical activity was assessed longitudinally. It is an interesting observation that the results of the cross-sectional data and the longitudinal data are very similar.

Acknowledgments

The authors wish to thank Markku Kauppinen for skilful statistical help in the study. The study was supported by the Finnish Ministry of Education (SA and UMK), Tekes – the Finnish Funding Agency for Technology and Innovation (grant number 1104/10) (UMK), the Juho Vainio Foundation (SA), and the Yrjö Jahnsson Foundation (SA). JK has been supported by the Academy of Finland Center of Excellence in Complex Disease Genetics (grant numbers: 213506, 129680). Data collection of the Finntwin16 study has been supported by U.S. National Institute of Alcohol Abuse and Alcoholism (grants AA-12502, AA-00145, and AA-09203 to R J Rose) and the Academy of Finland (grants 100499, 205585 and 141054 to JK).

References

Aaltonen S, Leskinen T, Morris T, Alén M, Kaprio J, Liukkonen J, Kujala UM. Motives for and barriers to physical activity in twin pairs discordant for leisure time physical activity for 30 years. Int J Sports Med. 2012; 33:157–163. [PubMed: 22318531]

Aaltonen S, Ortega-Alonso A, Kujala UM, Kaprio J. A longitudinal study on genetic and environmental influences on leisure time physical activity in the Finnish Twin Cohort. Twin Res Hum Gen. 2010; 13:475–481.

Allender S, Hutchinson L, Foster C. Life-changes events and participation in physical activity: a systematic review. Health Promot Int. 2008; 23:160–171. [PubMed: 18364364]

de Andrade Bastos A, Salguero A, Gonzalez-Boto R, Marquez S. Motives for participation in physical activity by Brazilian adults. Percept Mot Skills. 2006; 102:358–367. [PubMed: 16826657]

Ashford B, Biddle S, Goudas M. Participation in community sports centres: Motives and predictors of enjoyment. J Sports Sci. 1993; 11:249–256. [PubMed: 8336357]

Buckworth J, Lee RE, Regan G, Schneider LK, DiClemente CC. Decomposing intrinsic and extrinsic motivation for exercise: application to stages of motivational readiness. Psychol Sport Exerc. 2007; 8:441–461.

Brudzynski L, Ebben WP. Body image as a motivator and barrier to exercise participation. Int J Exerc Sci. 2010; 3:14–24.

Caglar E, Canlan Y, Demir M. Recreational exercise motives of adolescents and young adults. J Hum Kinet. 2009; 22:83–89.

Dacey M, Baltzell A, Zaichkowsky L. Older adult's intrinsic and extrinsic motivation toward physical activity. Am J Health Behav. 2008; 32:570–582. [PubMed: 18442337]

Deci, EL.; Ryan, RM. Intrinsic motivation and self-determination in human behavior. Vol. 5–10. New York: Plenum Press; 1985. p. 35-39.

Deci EL, Ryan RM. Self-determination theory in health care and its relations to motivational interviewing: a few comments. Int J Behav Nutr Phys Act. 2012; 9:24. [PubMed: 22385839]

Finkenberg ME, DiNucci JM, McCune SL, McCune ED. Analysis of course type, gender, and personal incentives to exercise. Percept Mot Skills. 1994; 78:155–159. [PubMed: 8177654]

Frederick CM, Ryan RM. Differences in motivation for sport and exercise and their relations with participation and mental health. J Sport Behav. 1993; 16:124–146.

Gill DL, Williams L, Dowd DA, Beaudoin CM, Martin JJ. Competitive orientations and motives of adult sport and exercise participants. J Sport Behav. 1996; 19:307–318.

Gordon-Larsen P, McMurray RG, Popkin BM. Determinants of adolescent physical activity and inactivity patterns. Pediatrics. 2000; 105:E83. [PubMed: 10835096]

Ingledew DK, Markland D, Medley AR. Exercise motives and stages of change. J Health Psych. 1998; 3:447–489.

Iso-Ahola SE, St Clair B. Toward a theory of exercise motivation. Quest. 2000; 52:131–147.

Kaprio J, Pulkkinen L, Rose RJ. Genetic and environmental factors in health-related behaviors: studies on Finnish twins and twin families. Twin Res. 2002; 5:366–371. [PubMed: 12537860]

Kilpatrick M, Hebert E, Bartholomew J. College students' motivation for physical activity: differentiating men's and women's motives for sport participation and exercise. J Am Coll Health. 2005; 54:87–94. [PubMed: 16255320]

Kolt GS, Driver RP, Giles LC. Why older Australians participate in exercise and sport. J Aging Phys Act. 2004; 12:185–198. [PubMed: 15223886]

Kujala UM, Kaprio J, Sarna S, Koskenvuo M. Relationship of leisure-time physical activity and mortality: The Finnish twin cohort. JAMA. 1998; 279:440–444. [PubMed: 9466636]

Kujala UM, Jokelainen J, Oksa H, Saaristo T, Rautio N, Moilanen L, Korpi-Hyövälti E, Saltevo J, Vanhala M, Niskanen L, Peltonen M, Tuomilehto J, Uusitupa M, Keinänen-Kiukaanniemi S. Increase in physical activity and cardiometabolic risk profile change during lifestyle intervention in primary healthcare: 1-year follow-up study among individuals at high risk for type 2 diabetes. BMJ Open. 2011; 1:e000292.

Leskinen T, Waller K, Mutikainen S, Aaltonen S, Ronkainen PH, Alen M, Sipilä S, Kovanen V, Perhonen M, Pietiläinen KH, Cheng S, Suominen H, Kainulainen H, Kaprio J, Kujala UM. Effects of 32-year leisure time physical activity discordance in twin pairs on health (TWINACTIVE study): Aims, design and results for physical fitness. Twin Res Hum Genet. 2009; 12:108–117. [PubMed: 19210186]

Morris JN, Everitt MG, Pollard R, Chave SP, Semmence AM. Vigorous exercise in leisure-time: Protection against coronary heart disease. Lancet. 1980; 316:1207–1210. [PubMed: 6108391]

Murcia JAM, Galindo CM, Pardo PM. Motivations and reasons for exercising in water: gender and age differences in a sample of Spanish exercisers. IJARE. 2008; 2:237–246.

Paffenbarger RS Jr, Hyde RT, Wing AL, Hsieh CC. Physical activity, all-cause mortality, and longevity of college alumni. N Engl J Med. 1986; 314:605–613. [PubMed: 3945246]

Pajunen, K. Master's Thesis in Finnish. University of Jyväskylä; 2004. Vapaa-ajan liikunnan motivaatiomittarin psykometriset ominaisuudet; p. 42-47.

Paluska SA, Schwenk TL. Physical activity and mental health: Current concepts. Sports Med. 2000; 29:167–180. [PubMed: 10739267]

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report 2008. U.S. Department of Health and Human Services; 2008.

Reid RM, McGowan I. A longitudinal psycho-physiological study of active and inactive men. Brit J Sports Med. 1986; 20:174–177. [PubMed: 3814990]

Rogers, H.; Morris, T. An overview of the development and validation of the Recreational Exercise Motivation Measure (REMM). XI the European Congress of Sport Psychology - proceedings; Copenhagen. 2003. p. 144

Ryan RM, Frederick CM, Lepes D, Rubio N, Sheldon KM. Intrinsic motivation and exercise adherence. Int J Sport Psychol. 1997; 28:335–354.

Ryan RM, Patrick H, Deci EL, Williams GC. Facilitating health behaviour hange and its maintenance: Interventions based on self-determination theory. The European Health Psychologist. 2008; 10:2–5.

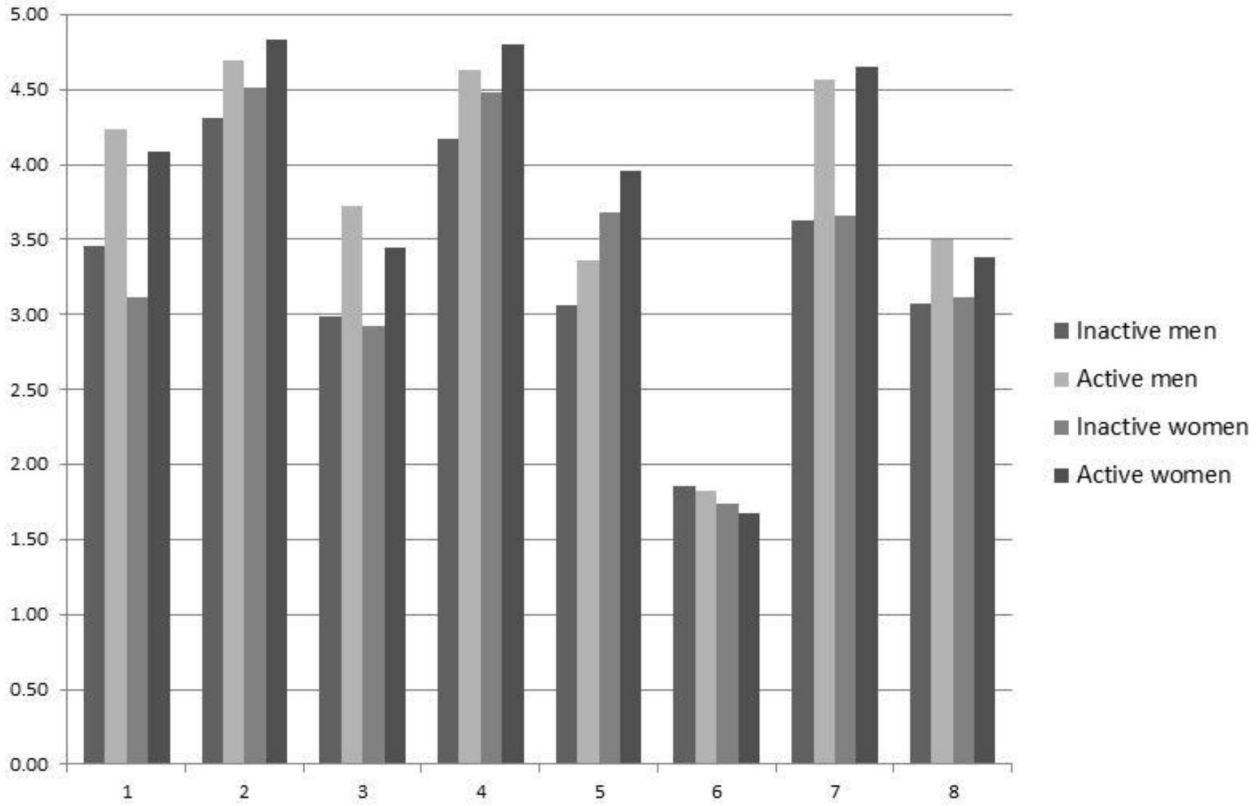
Teixeira PJ, Carraça EV, Markland D, Silva MN, Ryan RM. Exercise, physical activity, and self-determination theory: A systematic review. Int J Behav Nutr Phys Act. 2012; 9:78. [PubMed: 22726453]

Tsorbatzoudis H, Alexandris K, Zahariadis P, Grouios G. Examining the relationship between recreational sport participation and intrinsic and extrinsic motivation and amotivation. Percept Mot Skills. 2006; 103:363–374. [PubMed: 17165399]

Waller K, Kaprio J, Kujala UM. Associations between long-term physical activity, waist circumference and weight gain: A 30-year longitudinal twin study. Int J Obes (Lond). 2008; 32:353–361. [PubMed: 17653065]

PERSPECTIVE

The present findings not only provide valuable information on the differences in motivation factors between active and inactive persons but also evidence parallel results of the cross-sectional and longitudinal study designs, and confirm that intrinsic motives are strongly associated with consistent leisure time physical activity. Extrinsic motives, such us other peoples' expectations, may be temporarily important for inactive persons, but in the long term, intrinsic motives need to be present to induce consistent physical activity. This should be taken into account in health education situations where inactive people are counselled to be physically active. Instead of the traditional advice-based health education we need to help individuals to clarify their personal values and to take action on them giving reasons and making their behaviour more meaningful. Focusing on how to influence motives would be important area of future research since although we know that increasing one's level of physical activity has beneficial effects on cardio-metabolic risk, only a small proportion of the individuals who are a focus of clinical interventions actually do so (Kujala et al., 2011). In particular, research on how to arouse intrinsic motivation among inactive persons, and how to encourage inactive persons to exercise consistently would be welcomed.



1=Mastery, 2=Physical fitness, 3=Affiliation, 4=Psychological state, 5=Appearance, 6=Others' expectations, 7=Enjoyment, 8=Competition/ego

FIGURE 1.

Differences in sub-dimensions of motivation measure among active and inactive men and women. Physical activity level is based on leisure time MET hours/day.

TABLE 1

Characteristics of active and inactive persons at wave five (cross-sectional design and follow-up time point in longitudinal design).

Characteristics	Men			Women		
	Active	Inactive	p-value	Active	Inactive	p-value
	N=602	N=473		N=600	N=633	
Age (years; mean, range)	33.8 (32–37)	34.0 (32–37)		33.9 (32–36)	33.9 (32–38)	
Height (cm; mean ± SD)	182.1 ± 6.6	179.6 ± 6.5	0.27	166.0 ± 7.0	165.4 ± 5.8	0.10
Weight (kg; mean ± SD)	82.1 ± 11.3	84.7 ± 15.2	0.003	63.8 ± 10.3	67.0 ± 14.2	<0.001
BMI (kg/m^2; mean ± SD)	25.3 ± 3.2	26.2 ± 4.2	0.002	23.2 ± 5.3	24.5 ± 5.1	<0.001
Leisure time MET index (hours/day)	8.8 ± 3.6	1.0 ± 0.6	<0.001	9.2 ± 4.2	1.2 ± 0.6	<0.001
Work related physical activity			0.008			<0.001
Sedentary	49.5%	41.2%		42.3%	37.3%	
Standing or walking at work	20.9%	19.9%		26.2%	17.2%	
Light manual work	17.8%	20.9%		24.7%	22.1%	
Heavy manual work	8.5%	12.9%		2.5%	2.4%	
Not working or studying	3.3%	5.1%		7.3%	21.0%	
Subjective health status			<0.001			<0.001
Very good	33.4%	11.4%		35.8%	13.4%	
Good	58.1%	59.8%		55.2%	58.1%	
Fair	7.6%	24.9%		8.3%	23.9%	
Poor	0.8%	3.4%		0.7%	4.3%	
Very poor	0%	0.4%		0%	0.3%	

Characteristics	Men			Women		
	Active	Inactive	p-value	Active	Inactive	p-value
	N=602	N=473		N=600	N=633	
Financial standing			0.002			<0.001
Very good	14.4%	11.4%		12.2%	7.7%	
Good	48.2%	42.5%		40.3%	35.4%	
Fair	30.4%	34.5%		38.8%	40.4%	
Poor	5.6%	9.7%		8.3%	12.6%	
Very poor	1.3%	1.9%		0.3%	3.8%	
Chronic diseases			0.007			0.36
Yes	12.8%	19.0%		14.5%	16.4%	
No	87.2%	81.0%		85.5%	83.6%	
Subjective physical fitness			<0.001			<0.001
Very good	25.2%	1.5%		26.0%	0.9%	
Good	60.0%	34.0%		61.0%	32.1%	
Fair	13.5%	51.2%		12.3%	50.4%	
Poor	1.3%	12.7%		0.7%	15.2%	
Very poor	0%	0.6%		0%	1.4%	

SD = standard deviation

TABLE 2

Differences in sub-dimensions of motivation measure among active and inactive men and women.

Both men and women					
Sub-dimension	**Active Mean ± SD N=1 202**	**Inactive Mean ± SD N=1 106**	**Mean difference (95% CI)**	**p-value**	**Effect size Cohen's *d***
Mastery	4.16 ± 0.94	3.26 ± 1.23	−0.89 (−0.99 to −0.80)	<0.001	0.82
Physical fitness	4.76 ± 0.59	4.42 ± 0.76	−0.33 (−0.39 to −0.28)	<0.001	0.49
Affiliation	3.58 ± 1.22	2.95 ± 1.21	−0.64 (−0.73 to − 0.53)	<0.001	0.52
Psychological state	4.72 ± 0.63	4.35 ± 0.82	−0.37 (−0.43 to −0.31)	<0.001	0.51
Appearance	3.66 ± 1.14	3.42 ± 1.20	−0.24 (−0.34 to −0.14)	<0.001	0.20
Others' expectations	1.75 ± 0.96	1.79 ± 1.01	0.04 (−0.04 to 0.12)	0.3	−0.04
Enjoyment	4.61 ± 0.68	3.65 ± 1.09	−0.96 (−1.04 to − 0.88)	<0.001	1.07
Competition/ego	3.44 ± 1.23	3.09 ± 1.27	−0.35 (−0.45 to −0.24)	<0.001	0.28
Men	N=602	N=473			
Mastery	4.23 ± 0.91	3.46 ± 1.16	−0.77 (−0.90 to −0.64)	<0.001	0.75
Physical fitness	4.69 ± 0.69	4.31 ± 0.86	−0.38 (−0.47 to −0.28)	<0.001	0.49
Affiliation	3.72 ± 1.18	2.99 ± 1.17	−0.73 (−0.87 to −0.58)	<0.001	0.62
Psychological state	4.63 ± 0.72	4.17 ± 0.93	−0.47 (−0.57 to −0.36)	<0.001	0.57
Appearance	3.36 ± 1.17	3.06 ± 1.21	−0.30 (−0.44 to −0.15)	<0.001	0.25
Others' expectations	1.82 ± 0.97	1.86 ± 1.04	0.04 (−0.08 to 0.17)	0.47	−0.05
Enjoyment	4.57 ± 0.70	3.63 ± 1.05	−0.94 (−1.05 to −0.83)	<0.001	1.08
Competition/ego	3.50 ± 1.18	3.07 ± 1.22	−0.43 (−0.58 to −0.29)	<0.001	0.36
Women	N=600	N=633			
Mastery	4.09 ± 0.97	3.12 ± 1.25	−0.97 (−1.10 to −0.84)	<0.001	0.86
Physical fitness	4.83 ± 0.46	4.51 ± 0.67	−0.32 (−0.38 to −0.25)	<0.001	0.55
Affiliation	3.45 ± 1.24	2.92 ± 1.23	−0.53 (−0.67 to −0.39)	<0.001	0.43
Psychological state	4.80 ± 0.52	4.48 ± 0.69	−0.32 (−0.39 to −0.25)	<0.001	0.52
Appearance	3.96 ± 1.04	3.68 ± 1.11	−0.27 (−0.40 to −0.15)	<0.001	0.25
Others' expectations	1.67 ± 0.95	1.74 ± 0.99	0.06 (−0.05 to 0.17)	0.28	−0.14
Enjoyment	4.65 ± 0.65	3.66 ± 0.98	−0.98 (−1.09 to −0.88)	<0.001	1.05

Both men and women					
Sub-dimension	**Active Mean ± SD N=1 202**	**Inactive Mean ± SD N=1 106**	**Mean difference (95% CI)**	**p-value**	**Effect size Cohen's *d***
Competition/ego	3.38 ± 1.28	3.11 ± 1.30	−0.27 (−0.41 to −0.12)	<0.001	0.21

SD = standard deviation; CI = confidence intervals

TABLE 3

Differences in sub-dimensions of motivation measure among longitudinally active and inactive men and women.

Both men and women					
Sub-dimension	**Longitudinally active Mean ± SD N=617**	**Longitudinally inactive Mean ± SD N=532**	**Mean difference (95% CI)**	**p-value**	**Effect size Cohen's *d***
Mastery	4.21 ± 0.90	3.15 ± 1.23	−1.06 (−1.20 to −0.93)	<0.001	1.00
Physical fitness	4.81 ± 0.49	4.30 ± 0.82	−0.51 (−0.59 to −0.43)	<0.001	0.76
Affiliation	3.70 ± 1.19	2.83 ± 1.21	−0.87 (−1.01 to −0.73)	<0.001	0.73
Psychological state	4.76 ± 0.59	4.23 ± 0.84	−0.53 (−0.62 to −0.45)	<0.001	0.74
Appearance	3.61 ± 1.10	3.30 ± 1.20	−0.30 (−0.44 to −0.17)	<0.001	0.26
Others' expectations	1.69 ± 0.92	1.85 ± 1.05	0.15 (0.04 to 0.27)	0.01	−0.16
Enjoyment	4.75 ± 0.54	3.39 ± 1.13	−1.36 (−1.47 to − 1.25)	<0.001	1.57
Competition/ego	3.47 ± 1.22	3.02 ± 1.26	−0.45 (−0.60 to −0.31)	<0.001	0.36
Men	N=334	N=240			
Mastery	4.29 ± 0.83	3.33 ± 1.19	−0.96 (−1.14 to −0.79)	<0.001	0.97
Physical fitness	4.73 ± 0.60	4.20 ± 0.90	−0.53 (−0.66 to −0.39)	<0.001	0.71
Affiliation	3.93 ± 1.06	2.80 ± 1.19	−1.13 (−1.32 to −0.94)	<0.001	1.01
Psychological state	4.66 ± 0.69	4.05 ± 0.96	−0.61 (−0.75 to −0.46)	<0.001	0.76
Appearance	3.34 ± 1.14	3.05 ± 1.22	−0.28 (−0.48 to −0.09)	0.004	0.25
Others' expectations	1.78 ± 0.93	1.94 ± 1.07	0.16 (−0.01 to 0.33)	0.07	−0.16
Enjoyment	4.71 ± 0.58	3.33 ± 1.12	−1.38 (−1.54 to −1.23)	<0.001	1.64
Competition/ego	3.52 ± 1.19	3.00 ± 1.24	−0.52 (−0.72 to −0.32)	<0.001	0.43
Women	N=283	N=292			
Mastery	4.13 ± 0.97	3.01 ± 1.25	−1.12 (−1.31 to −0.93)	<0.001	1.05
Physical fitness	4.90 ± 0.30	4.38 ± 0.74	−0.52 (−0.61 to −0.43)	<0.001	0.91
Affiliation	3.43 ± 1.28	2.85 ± 1.23	−0.57 (−0.79 to −0.36)	<0.001	0.46
Psychological state	4.87 ± 0.43	4.37 ± 0.70	−0.50 (−0.60 to −0.41)	<0.001	0.87
Appearance	3.93 ± 0.96	3.52 ± 1.14	−0.42 (−0.59 to −0.24)	<0.001	0.39
Others' expectations	1.59 ± 0.90	1.77 ± 1.03	0.18 (0.02 to 0.34)	0.03	−0.19
Enjoyment	4.79 ± 0.49	3.44 ± 1.15	−1.35 (−1.50 to −1.21)	<0.001	1.53

Scand J Med Sci Sports. Author manuscript; available in PMC 2015 August 01.

Both men and women					
Sub-dimension	**Longitudinally active Mean ± SD N=617**	**Longitudinally inactive Mean ± SD N=532**	**Mean difference (95% CI)**	**p-value**	**Effect size Cohen's *d***
Competition/ego	3.41 ± 1.27	3.03 ± 1.30	−0.38 (−0.59 to −0.17)	<0.001	0.30

SD = standard deviation; CI = confidence intervals

TABLE 4

Differences in sub-dimensions of motivation measure among longitudinally inactive persons and persons who changed from inactive to active during follow-up.

Sub-dimension	Change from inactive to active Mean ± SD N=228	Longitudinally inactive Mean ± SD N=532	Mean difference (95%CI)	p-value	Effect size Cohen's *d*
Mastery	4.00 ± 1.12	3.15 ± 1.23	−0.85 (−1.03 to −0.67)	<0.001	0.71
Physical fitness	4.63 ± 0.82	4.30 ± 0.82	−0.33 (−0.45 to −0.20)	<0.001	0.40
Affiliation	3.42 ± 1.30	2.83 ± 1.21	−0.59 (−0.78 to − 0.39)	<0.001	0.48
Psychological state	4.59 ± 0.75	4.23 ± 0.84	−0.36 (−0.48 to −0.24)	<0.001	0.44
Appearance	3.64 ± 1.26	3.30 ± 1.20	−0.34 (−0.53 to 0.15)	0.006	0.28
Others' expectations	1.79 ± 1.01	1.85 ± 1.05	0.06 (−0.10 to 0.21)	0.47	−0.06
Enjoyment	4.32 ± 0.83	3.39 ± 1.13	−0.93 (−1.08 to − 0.79)	<0.001	0.89
Competition/ego	3.45 ± 1.24	3.02 ± 1.26	−0.43 (−0.63 to −0.24)	<0.001	0.34

SD = standard deviation; CI = confidence intervals