Psychology of Sport and Exercise 13 (2012) 371–377

Contents lists available at SciVerse ScienceDirect

Psychology of Sport and Exercise

journal homepage: www.elsevier.com/locate/psychsport

Fitness correlates of obligatory versus health motives for exercise: An examination of men in the military

Jennifer N. Wilson [a,*], Charlotte N. Markey [a], Patrick M. Markey [b]

[a] Rutgers University, United States
[b] Villanova University, United States

ARTICLE INFO

Article history:
Received 6 August 2010
Received in revised form
18 November 2011
Accepted 4 January 2012
Available online 24 January 2012

Keywords:
Obligatory exercise
Intrinsic motivation
Extrinsic motivation
Military
Health

ABSTRACT

Objectives: To examine quantity of exercise and motives for exercise as predictors of men in the military's health and fitness level.
Design: Participants completed a survey to address research questions of interest.
Methods: One-hundred and fourteen men who were active duty Air Force members, with a mean age of 31.43 years (SD = 7.43) and an average military time in service of 10.66 years (SD = 7.75), completed a modified version of the Reasons for Exercise Inventory, a survey assessing their quantity of exercise, and reported their most recent score on their Air Force Fitness Test.
Results: Correlational analyses indicated a relation between quantity of exercise and men's score on the Air Force Fitness Test and a relation between intrinsic motives for exercise and quantity of exercise. Intrinsic motivation was found to moderate the relation between quantity of exercise and men's health and fitness score.
Conclusions: Men in the military who exercise because of their military obligation are less likely to score high on the Air Force Fitness Test than are men who are motivated to exercise for health benefits.
Published by Elsevier Ltd.

Physical activity is widely recognized as a significant contributor to both physical and psychological health (Blake, Mo, Malik, & Thomas, 2009; Brenes et al., 2007; Daley & Parfitt, 1996; Garner, 1997; Greif, Kreitler, Kaplinsky, Behar, & Scheinowitz, 1995; Lutz et al., 2008; Rendi, Szabo, Szabo, Velenczei, & Kovacs, 2008; Ryan, 2008). The benefits of exercise appear to be long-term if exercise is continued and some research even suggests that frequency, intensity, volume, and reasons for exercise predict self-reported quality of life (Lustyk, Widman, Paschane, & Olson, 2004). In particular, high frequency, low intensity exercise motivated by interest in increasing or preserving health and fitness has been shown to be positively associated with quality of life reports. Consistent with these findings, Sebire, Standage, and Vansteenkiste (2009) have found a positive association between intrinsic exercise goals (health management, skill development, and social affiliation) and adaptive benefits of exercise, but this appears to be mediated by participants' psychological need satisfaction.

In spite of these reported benefits of exercise, a 2009 report of the Gallup-Healthways Well-Being Index (Gallup, 2009), which interviewed more than 400,000 adults, revealed that only one in four Americans followed the Department of Health and Human Services Physical Activity guidelines of at least 30 min of exercise five days per week or more. However, consistent with research described above, the report revealed both a positive correlation between the number of days a person exercised and self-reported happiness and a negative relationship between number of days a person exercised and self-reported stress. Neftzer, a lead researcher at Healthways, suggested that although most people are aware they should exercise to attain various health benefits, most often they do not achieve the recommended amount of exercise in order to reap the potential benefits ("In U.S., Nearly", 2009). The culprit keeping most people from exercising as regularly as they know they should appears to be lack of motivation (Mendes, 2009).

Motivation (or lack there-of) appears to be a significant factor influencing not only individuals' interest in maintaining an exercise regimen, but the benefits gained from any particular regimen (Kilpatrick, Hebert, & Bartholomew, 2005). In particular, extrinsic motives for exercise are thought to contribute to an increase in individuals' stress, but intrinsic motives are believed to promote a reduction in stress and overall improved psychological well-being (Markland & Ingledew, 2008). In this literature, extrinsic motives are commonly defined as originating outside of the individual (e.g., due to social influence), whereas intrinsic motives originate within the individual (e.g., due to personal desire; Markland & Ingledew, 2008). Although some literature has clearly categorized health-related exercise motives as intrinsic or well-internalized extrinsic

* Corresponding author. Orange Park, FL 32073, United States.
E-mail address: jw1608@nova.edu (J.N. Wilson).

1469-0292/$ – see front matter Published by Elsevier Ltd.
doi:10.1016/j.psychsport.2012.01.002

(Ryan, Williams, Patrick, & Deci, 2009; Vansteenkiste, Lens, & Deci, 2006), other research has differentiated between motive subtype and degree of autonomy (Maltby & Day, 2001; Mullan, Markland, & Ingledew, 1997; Ryan & Deci, 2000; Wilson, Rodgers, & Fraser, 2002). Whether health motives are categorized as intrinsic, well-internalized extrinsic, or they fall along a continuum of self-determination (Deci & Ryan, 2000), they are undoubtedly more self-determined than externally-imposed obligatory motives (i.e., military motives).

Prior studies examining the association between exercise motives and psychological well-being have often focused primarily on women (Asci, Kin, & Kosar, 1998; Asci, 2003; Mond, Hay, Rodgers, Owen, & Beumont, 2004; Rhea, 1998; Wilson & Rodgers, 2004). However, some data suggest that women and men frequently have different motives for engaging in physical activities. Although women commonly exercise for weight loss purposes, men are apt to have more diverse motives (e.g., fitness, weight-gain; Furnham & Calnan, 1998; Jonason, 2007). Thus, motives associated with physical activity may be particularly important to understanding men's exercise patterns (Furnham & Calnan, 1998).

As early as the 1950's, studies have revealed a positive correlation between intrinsic motivation and enhanced performance. Harlow (1953) found a link between improved problem-solving skills and intrinsic motivation (as opposed to extrinsic/reward motives). Self-Determination Theory (SDT, Deci & Ryan, 1991, 2000) has been used to describe the reported benefits of self-determined (i.e., a locus of causality being internal to the individual) exercise (Hagger & Chatzisarantis, 2007; Moreno, Gonzales-Cutre, Sicilia, & Spray, 2010). For example, Brunet and Sabiston's (2010) research suggests that intrinsic motivation is a positive correlate of exercise across the adult lifespan. In contrast, they find that external regulation of exercise is a negative correlate of young adults' physical activity. Moreover, Standage, Sebire, and Loney (2008) objectively evaluated exercise behavior using heart rate monitors and motion sensors and found self-reported autonomous motivation predicted moderate-intensity exercise among British college students. According to SDT, environmental and interpersonal factors may contribute to or detract from intrinsic motivation, which in turn may be linked to the ability of exercise regimens to persist (Hagger & Chatzisarantis, 2007). Likewise, although Ingledew, Markland, and Medley (1998) discovered an association between extrinsic motives and initial exercise adoption, they found intrinsic motives were key in exercise progression and maintenance.

Although research focusing on intrinsic versus extrinsic motivation has become increasingly theoretically driven and specific in focus (e.g., Moreno et al., 2010), there has been relatively little research examining the potential positive or negative effects of exercise when exercise is "obligatory." One study, which examined obligatory runners, discovered significant differences between obligatory and non-obligatory exercisers related to perfectionism and increased anxiety (Coen & Ogles, 1993). Participants who reported exercising for obligatory reasons frequently displayed more perfectionism and increased anxiety than those who exercised for non-obligatory reasons. Furthermore, Matheson and Crawford-Wright (2000) found that student obligatory exercisers were at an increased risk for future compulsive exercise or disordered eating. However, it should be noted that this sample was comprised of undergraduate students (mostly women) and obligatory exercise was self-imposed. The study defined obligatory exercise as "continuing exercise despite pain, interference with significant relationships or work, lack of time for other leisure pursuits, recognized obsession with the activity, and other psychological problems," (Matheson & Crawford-Wright, 2000, p.1) similar to definitions of obligatory exercise provided by other researchers (e.g., Polivy, 1994). Little research to date has examined obligatory exercise (and related motives for exercise) when the sense of obligation to exercise has been imposed by an external source (i.e., externally-imposed obligatory exercise; see Kingston, Horrocks, & Hanton, 2006). Mullan et al. (1997) designed the Behavioral Regulation in Exercise Questionnaire (BREQ) to evaluate exercise motives along the self-determination continuum. From least self-determined to most self-determined, the continuum includes external regulation, introjected regulation, identified regulation, and integrated regulation subscales. With regards to the BREQ subscales, external regulation would include the externally-imposed, obligatory motives (such as military motives examined in this research) and a combination of both identified regulation and integrated regulation would comprise the intrinsic/health motives we consider in this research. Along this continuum, intrinsic motives (e.g., for health, stress reduction, and enjoyment) are more self-determined than externally-imposed obligatory motives and can be expected to increase probability of persistence and reap greater benefits.

In the present study, we examine exercise and motives for exercise as predictors of participants' health and fitness within a military sample. In other words, participants in this study were obligated to exercise to pass health and fitness tests, which allow them to maintain their military jobs. If an exercise regimen is not maintained, and health and fitness tests are not passed, participants in this study risk losing their military position or facing other serious administrative consequences.

Physical fitness is extremely important to members of the armed services due to the amplified physical and mental demands of their job. Deployments, combat and routine, frequently cause a high degree of stress and anxiety for service members due to extreme temperatures, jetlag, lack of sleep, family separation, and sometimes heavy lifting during initial camp setup. Good physical conditioning can help protect against this strain on the body (Alexander, 2002). Additionally, new research suggests that physical fitness may shield soldiers against combat stress symptoms and its effects may be mediated by fitness-related attenuations in trait anxiety (Taylor et al., 2008). In the current study, we will be focusing on men serving in the U.S. Air Force. Members of the Air Force are obligated to maintain a certain level of physical fitness in order to maintain their employment in the military. At the time this study was conducted both the Air Force fitness program and assessment were regulated by Air Force Instruction (AFI) 10-248 (Department of the Air Force, 2006). The fitness program is mostly commander-driven, in that each commander is given the authority to decide what type of training to require of their personnel year round for maintenance of fitness and general readiness, provided the policy meets or exceeds requirements described in AFI 10-248. However, AFI 10-248 clearly states that duty time must include some degree of physical training as part of the mission requirements. All Air Force members are personally responsible for physical training a minimum of three times per week. Commanders may allow three to five times per week of time off for personnel to exercise during the duty day. This allowance is at the commander's discretion. Additionally, many commanders require periodic group fitness sessions for the entire squadron, such as a morning run. Specific fitness requirements of the squadron examined in the present study will be described in the Method section. Although support systems are in place to help military members achieve their required fitness goals, even military officials have recently expressed concern about the efficacy of the current physical fitness program (Gaudiano, 2005; Hoffman, 2008).

The present study

Although motives for exercise have been explored in past research, there is a dearth of literature on extrinsically-motivated,

obligatory exercise and no research to date addressing this issue within a military sample. Thus, our primary goal is to investigate the relationship between physical activity and fitness benefits among men in the military with a focus on their motives associated with exercise. First, it is hypothesized that individuals who exercise will tend to be healthier and more fit (as assessed by an objective test given by the military) than individuals who do not exercise as much. Second, it is expected that exercise frequency will be more strongly related to intrinsic motivation (e.g., to improve health, socialize, or reduce stress) than to externally-imposed obligatory motivation (e.g., the need to perform well on the military tests). Third, we hypothesize that although exercise will be positively related to health and fitness, intrinsic motivation will moderate this effect. Specifically, it is expected that exercise frequency will be more strongly related to health and fitness scores for individuals who are exercising for intrinsic motives than for individuals who are externally motivated due to their military obligations.

Method

Participants and procedures

One-hundred and fourteen adult males participated in the present study as part of an examination of the potential benefits gained from regular physical activity. Men's mean age was 31.43 years (SD = 7.43), with an age range from 19 to 56 years. The mean military time in service for participants was 10.84 years (SD = 7.44). In order to be eligible for this study, participants were required to be active duty Air Force members. All participants were volunteers who were currently stationed at an Air Force Base in New Jersey. They were members of a specific squadron, which performed duties dealing with various aspects of aircraft maintenance. The majority of participants were on standby for regular rotations of four to six month deployments, once per year on average. Typically, airmen within the squadron that participated in this study took part in mandatory group exercise twice each week and individual exercise at least once per week. All mandatory exercise required sign-in on a squadron fitness log and group sessions were observed by the Physical Training Leader (PTL). Standard sessions included running, push-ups, sit-ups, as well as other varying calisthenics (e.g., jumping jacks). However, members enrolled in the Fitness Improvement Program (due to low fitness test scores) were required to exercise at least five times per week (including previously mentioned weekly sessions).[1] The volunteers were recruited from a squadron with a membership of approximately 250 airmen. Potential participants were briefed at their shift change regarding study procedures and eligibility to win a $100 Visa card, which would be raffled off at the end of data collection. Participants completed a consent form and a series of questionnaires related to their background information, previous and current fitness habits, and their reasons for exercise. The study's purpose, included on the consent form, was to examine participants' fitness habits and the impact of fitness level on well-being. All measures were self-report surveys. The entire packet took approximately 20 min to complete. When finished, the participants placed the entire manila folder, containing the survey packet, into a provided drop box centrally located in the break-room of their workplace. No identifying information was requested on the surveys. This protocol was approved by the institutional review board of the sponsor university, as well as by leadership within the squadron from which the participants were recruited.

Measures

Background and exercise information

Participants first completed a measure that assessed demographic qualities including ethnicity, age, rank and time in service. Additionally, each participant indicated the mean number of days per week they tend to exercise (range = 0 days −7 days; $M = 3.28$ days, SD = 1.31). The specific question addressing exercise frequency was "How frequently do you currently exercise during a normal week? ____ days."

Motive measures

A modified version of the "Reasons for Exercise Inventory" (Silberstein, Striegel-Moore, Timko, & Rodin, 1988) was given to the participants to assess the reasons they reported for exercising. This 12-item, seven-point Likert scale measure was adapted to include military motive items and was composed of seven items which assessed intrinsic motivation (e.g., "To improve my overall health") and five items which evaluated obligatory motivation. The appended military, obligatory motive items included "To pass my annual fitness test", "To avoid military disciplinary action", "To maintain physical deployment readiness", "To progress in my career and remain eligible for promotion", and "To gain respect from coworkers, peers, and superiors". With regard to anchors, one represented "*Not at all important to me*" and seven represented "*Extremely important to me*." The Reasons for Exercise Inventory (Silberstein et al., 1988) was chosen due to the items and subscales that comprise it. Specifically, we were interested in a measure that could be easily adapted to include items to assess externally-motivated obligatory exercise due to military requirement. Both the intrinsic/health ($\alpha = .89$; $M = 5.31$, SD = 1.09) and obligatory ($\alpha = .85$; $M = 4.89$, SD = 1.60) motivation scales obtained adequate reliability.

Health and fitness

The U.S. Air Force Fitness Test (Department of the Air Force, 2006) was used as an objective measure of participants' health and fitness. Participants reported the total score of their most recent health and fitness assessment. Although the Air Force titles this a "fitness test," components of this assessment (e.g., body mass index) are more commonly referred to by researchers as indicative of health, not necessarily fitness. Thus, we refer to this as an assessment of both health and fitness. This assessment contains three components, including aerobic fitness, muscular fitness, and body composition. The assessment is performed annually if a passing score is achieved and after 90 days if one receives a non-passing score. Specific elements of the fitness test consist of a timed 1.5-mile run, 1-min timed crunch test, 1-min timed push up test, and a body composition test (check of height, weight, and abdominal circumference). Prior to a fitness assessment, all members must complete the Fitness Screening Questionnaire to measure each individual's risk for cardiovascular disease, as well as other potentially dangerous chronic illnesses. Based on objective performance, composite scores range from 0 to 100 points with a maximum of 50 points awarded for the aerobic test, 30 points for body composition, 10 points for the push up test, and 10 points for the crunch test. An individual's points per section are determined by referring to age and gender specific fitness score charts.

The following formula is used to establish a member's score:

$$\text{Composite Score} = \frac{\text{Total Component Points Achieved}}{\text{Total Possible Points}} \times 100$$

[1] Only three of 114 participants in our sample did not pass their most recent fitness tests. Because the results do not change when these participants are included in the analyses, we have decided to include the entire sample in the results of the manuscript.

A score of 90 or above (excellent fitness level) or between 75 and 89.99 (good fitness level) allows an individual to retest annually without any remedial training imposed. A score of 75 is the minimum accepted health, fitness, and readiness level. Any score below 75 indicates a poor fitness level and a test failure. Test failure requires a retest in 90 days, attendance at a Healthy Living Workshop (addresses behavioral change, nutrition education, and exercise education), targeted intervention seminars, and enrollment in the Fitness Improvement Program. The Fitness Improvement Program provides the airman with a personalized exercise regimen, which will be monitored four to five days per week until a passing score is achieved, and monthly meetings to address any concerns. Additionally, personnel with a high abdominal circumference are enrolled in the Body Composition Improvement Program, conducted by a staff member who is trained in nutrition counseling, until they are able to achieve a score of 75 or above. All military members must maintain a high level of fitness as their fitness level is considered an indicator of an airman's ability to tolerate extremes in temperature, fatigue, and stress while performing duties in a challenging overseas environment. If airmen are repeatedly unsuccessful in completion of their fitness test they risk receiving poor performance reports, punitive administrative actions, and involuntary discharge. In the current sample, only three of the 114 participants held scores below 75 (within the non-passing range).[2] Scores ranged from 46 to 100 ($M = 83.75$; SD = 7.04).

Results

Table 1 displays the correlations for all the variables examined in the current study, controlling for age. Supporting Hypotheses 1 and 2, exercise was positively related to health and fitness ($pr = .19$, $p < .05$) and exercise was more strongly ($t(111) = 4.78$, $p < .001$; $r = .41$; equation 2.8.8, Cohen & Cohen, 1983) related to health motives ($pr = .48$, $p < .01$) than obligatory motives ($pr = -.03$, $p = .75$). Further, the relation between health motives and exercise remained large and significant even when obligatory motives were controlled ($pr = .47$, $p < .01$). In order to examine the third hypothesis of this study, that health motivation will moderate the effect of exercise on health and fitness, hierarchal regression analysis was utilized. In this model the variables age (A), exercise (E), obligatory motivates (OM), and health motives (HM) were entered in the first step. The two-way interactions of interest were then entered in the second step (E × OM and E × HM). To reduce issues associated with multicollinarity, all variables were centered before computing interaction terms (Cohen & Cohen, 1983).

As suggested by Baron and Kenny (1986), the significant interaction between intrinsic health-related motivation and exercise presented in Table 2 suggests that a person's intrinsic motivation alters the effect of exercise on health and fitness. In order to examine exactly how intrinsic motivation moderated the effect of exercise on health and fitness, a graphical representation of this interaction was created (see Fig. 1). This graph was derived by calculating simple regression equations for participants of average age and obligatory motives who were either at the mean on intrinsic health-related motivation (i.e., moderate levels of intrinsic motivation), .5 standard deviations above the mean (i.e., high levels of intrinsic motivation), or .5 standard deviations below the mean (i.e., low levels of intrinsic motivation; see Aiken & West, 1991). As this figure indicates, and consistent with Hypothesis 3, individuals who had high levels of intrinsic health-related motivation tended to exhibit a stronger, positive relation between exercising and health and fitness versus individuals who had moderate or low levels of intrinsic health-related motivation.

Table 1
Partial correlations among constructs examined, controlling for age.

	Health and fitness	Exercise (amount)	Health motives	Obligatory motives
Health and Fitness	–			
Exercise (Amount)	.19[a]	–		
Health Motives	.17	.48[b]	–	
Obligatory Motives	−.11	−.03	.17	–

$n = 114$.
[a] $p < .05$.
[b] $p < .01$.

Discussion

This study aimed to investigate the relation between exercise and health and fitness among men in the military with a focus on men's motives associated with exercise. It was hypothesized that individuals who exercise would be healthier and more fit (as assessed by the military) than individuals who do not exercise as frequently. It was also expected that a person's exercise frequency would be more strongly related to intrinsic health-related motivates than to extrinsic, obligatory motivates. Finally, we predicted that although exercise would be positively correlated with health and fitness, intrinsic health-related motives would moderate this outcome. Therefore, exercise frequency would be more strongly related to health and fitness scores for individuals who exercised for primarily intrinsic health-related reasons than those who were exercising for more extrinsic, obligatory reasons.

The results supported all of our hypotheses. Regarding Hypotheses 1 and 2, results suggest that exercise was positively related to health and fitness level and exercise frequency was more strongly related to intrinsic health-related motives than obligatory motives. These results are consistent with previous research examining the benefits of exercise (Asci et al., 1998; Blake et al., 2009; Brenes et al., 2007; Bundy, Carroll, Wallace, & Nagle, 1998; Craft & Landers, 1998; Garner, 1997; Hausenblas & Fallon, 2006; Rendi, Szabo, Szaboo, Velenczei, & Kovacs, 2008; Ryan, 2008; Stroth, Hille, Spitzer, & Reinhardt, 2009), but were extended to observe the relationship between exercise and obligatory motives within a military sample. Increased exercise was related to

Table 2
Multiple regression analysis predicting health and fitness.

	B	SE B	β	Semi-partial *r*
Step 1	$R^2 = .22$[b]			
Age (A)	−.29	.08	−.31[b]	−.31
Exercise (E)	.80	.53	.12	.07
Obligatory Motives (OM)	−.62	.40	−.13	−.13
Health Motives (HM)	1.01	.64	.18	.14
Step 2	$R^2 = .26$[b]	$\Delta R^2 = .04$[a]		
E × OM	−.11	.33	−.03	−.10
E × HM	.80	.38	.22[a]	.21

$n = 114$.
[a] $p < .05$.
[b] $p < .01$.

[2] To avoid confusion, we did not include great detail regarding the exercise regimen of members in the Fitness Improvement Program. Individuals with current failing fitness scores were required to enroll in the Fitness Improvement Program and exercise more frequently, under somewhat closer monitoring until they attained a passing score. Specifically, they were required to complete the same exercise regimen as other members, along with two additional weekly, individual, exercise sessions (for which they signed-in with base gym staff). The standing squadron commander authorized that these two additional sessions could be completed during duty hours, provided workload allowed.

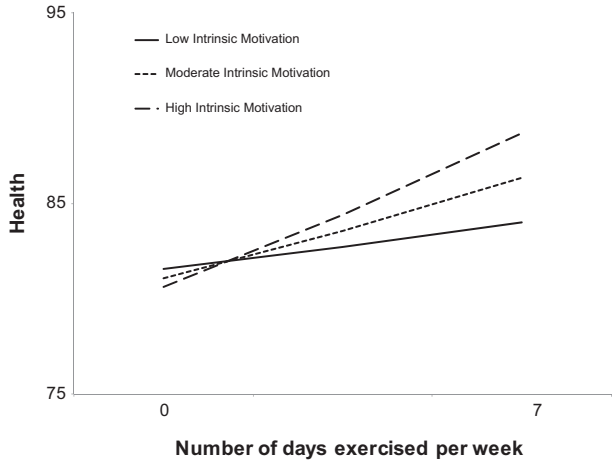

Fig. 1. Interaction between self-reported average number of days exercised per week and intrinsic motivation when predicting health and fitness. A graphic representation of the regression equation: health = 92.16 = −.28 (Age) + .75 (Exercise) − .69 (Obligatory motives) + 1.68 (Intrinsic motives) − .11 (Exercise × Obligatory motives) + .80 (Exercise × Intrinsic motives).

improved health and fitness level and increased exercise frequency also appears to be related to intrinsic health-related motivation. These findings are noteworthy given the obligatory state of exercise among military personnel. In fact, whether or not members of the military are able to retain their positions is partially dependent on their health and fitness assessment annually (Department of the Air Force, 2006). The findings of this study closely parallel previous research addressing motivation among college athletes. For example, Kingston et al. (2006) have found that athletes awarded scholarships may experience lower levels of intrinsic motivation than those who are not. Presumably, the external reward of a scholarship (or continued employment, in the case of Air Force personnel) undermines individuals' focus on their intrinsic reasons for pursuing their goals. Similarly, in a study of 252 office employees, Ingledew and Markland (2008) presented a model wherein personality influences exercise motive, thus predicting one's behavioral regulation and exercise participation. Consistent with our findings, their results revealed that health/fitness motives increased identified regulation and therefore were positively related to exercise participation. Cultivating a sense of intrinsic health-related motivation to maintain health and fitness among military personnel may be difficult, given these parameters, but would likely benefit not only their level of health and fitness, their well-being, and their capacity to serve in the military effectively, but also the funds and energy expended to motivate, punish and cajole personnel not scoring within the acceptable range on health and fitness tests (Hoffman, 2010).

With regard to Hypothesis 3, we found that intrinsic health-related motivation significantly moderated the association between exercise and improved health and fitness. Individuals who reported pursuing intrinsic health-related reasons for exercise appear to reap greater benefits from exercise than individuals who are exercising for other (e.g., obligatory) reasons. In fact, our results suggest that quantity of exercise (as assessed by number of days per week individuals' exercise) does not predict scores on the military's health and fitness assessment for individuals who are not intrinsically motivated to exercise. It appears that individuals can "go through the motions" of exercising daily, but without the sense of exercising out of a desire to improve their health, they do not benefit any more from exercise than do individuals who spend less time exercising. These data cannot conclusively determine why this is, but it can be speculated that individuals who do not have intrinsic health-related motives to exercise do not exert themselves physically, are not committed to improving their fitness levels, and do the bare minimum they believe is expected of them. In contrast, our findings indicate that individuals who have intrinsic health-related motives to exercise appear to reap significant benefits from the amount of time (i.e., days per week) devoted to exercise. Taken together, our findings suggest that both the "quantity" and "quality" (as determined by motivation for exercise) are important to consider in understanding the benefits individuals will derive from exercise.

Limitations and conclusions

Two key limitations of the present study included a narrow sample of only men in the Air Force and the unknown validity of the assessments of both (a measure created and used by the military). Given the overrepresentation of men in the military, we found it difficult to recruit female participants. Future research may be able to rectify this limitation by encouraging participation of individuals in military career fields that are more gender balanced (i.e., medical or administrative fields). Further, although the assessment of exercise was related to an objective assessment of fitness, the validity of this single-item assessment is unknown. In light of our unique sample of active duty Air Force members, it was difficult to give them a battery of assessments (or lengthy assessments). Obviously, since there is only one item, we cannot compute reliability from this data set. However, given the face validity of the question ("what is the average number of days per week you exercise") it appears likely that the responses would be fairly accurate. Consistent with this notion (and as predicted), across the sample, self-report of exercise was correlated with our objective assessment of fitness. Clearly, it would be useful for future researchers to incorporate additional measures of frequency, intensity, and duration of fitness when examining the potential moderating effect of intrinsic or health motivation. Although we can surmise that participants' exercise was moderate to high frequency and intensity for a time period ranging from one to 30 years as a result of their self-reported time in service, it is unclear how long they were physically active within that range. In addition, despite validation of the REI (Silberstein et al., 1988) through previous research, a clear limitation of this study stems from our use of the untested, modified version.

Because participants receiving failing fitness scores take part in more frequent exercise each week, we considered the possibility that this group may impact our results by inflating the observed interaction. However, this group consisted of three out of 114 participants and when included they do not significantly affect the results. Therefore, we have decided to include the entire sample in the reported results. Given that previous research has found exercise motives to be associated with personality traits (Courneya & Hellsten, 1998; Ingledew & Markland, 2008), future research examining how exercise motives and exercise participation might be mediated by personality traits among a military sample may be worthwhile.

In spite of the aforementioned limitations, the present study extends past research examining associations between physical activity and its benefits by investigating a unique sample (men in the military) and focusing on exercise motives: obligatory versus intrinsic health-related. Our findings suggest that individuals who engage in physical activity, but do not feel personally motivated to participate in it may not reap the benefits to the same degree as those who have intrinsic health-related motives. More specifically, when men exercise because they have to in order to maintain their job in the military, they appear not to reap the benefits of exercise

in terms of their health and fitness level. These findings demonstrate the potential value of implementing military physical training programs that emphasize the intrinsic reasons for exercise (e.g., to improve health and increase longevity) over obligatory reasons.

This study has implications for our overall understanding of the success of various exercise interventions. Our findings suggest that the number of days an Air Force member engages in physical activity is more strongly related to their physical fitness if they have intrinsic health-related reasons for exercising than if they are exercising simply in order to maintain their job in the military. Thus, fitness programs adapted to focus on intrinsic motivation might prove more successful and beneficial to both the individual and the military in the long run. Future research should investigate other forms of obligatory exercise, include other branches of the military, military women, and fire and police workers. A further understanding of not just how much individuals engage in exercise, but *why* they engage in exercise appears critical if improving health and fitness is the desired eventual outcome of exercise.

Acknowledgments

This research was supported by a grant from Rutgers University awarded to the first author.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.

Alexander, M. (2002). A physically fit airman: an essential element for agile combat support in the AEF. *Air Force Journal of Logistics, 26*(4), 38–41.

Asci, F. H. (2003). The effects of physical fitness training on trait anxiety and physical self-concept of female university students. *Psychology of Sport and Exercise, 4*(3), 255–264. doi:10.1016/S1469-0292(02)00009-2.

Asci, F. H., Kin, A., & Kosar, S. (1998). Effects of participation in an 8 week aerobic program on physical self-perception and body images. *International Journal of Sports and Exercise Psychology, 29*, 366–375.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.

Blake, H., Mo, P., Malik, S., & Thomas, S. (2009). How effective are physical activity interventions for alleviating depressive symptoms in older people? *Clinical Rehabilitation, 10*, 873–887. doi:10.1177/0269215509337449.

Brenes, G., Williamson, J., Messier, S., Rejeski, W., Pahor, M., Ip, E., et al. (2007). Treatment of minor depression in older adults: a pilot study comparing sertraline and exercise. *Aging and Mental Health, 11*, 61. doi:10.1080/13607860600736372.

Brunet, J., & Sabiston, C. (2010). Exploring motivation for physical activity across the adult life span. *Psychology of Sport and Exercise, 12*(2), 99–105. doi:10.1016/j.psychsport.2010.09.006.

Bundy, C., Carroll, D., Wallace, L., & Nagle, R. (1998). Stress management and exercise training and chronic stable angina pectoris. *Psychology and Health, 13*, 147–155. doi:10.1080/08870449808406138.

Coen, S., & Ogles, B. (1993). Psychological characteristics of the obligatory runner: a critical examination of the anorexia analogue hypothesis. *Journal of Sport and Exercise Psychology, 15*, 338–354.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression: Correlation analysis for the behavioral sciences*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Courneya, K., & Hellsten, L. A. (1998). Personality correlates of exercise behavior, motives, barriers and preferences: an application of the five-factor mode. *Personality and Individual Differences, 24*(5), 625–633. doi:10.1016/S0191-8869(97)00231-6.

Craft, L., & Landers, D. (1998). The effects of exercise on clinical depression and depression resulting from mental illness: a meta-analysis. *Journal of Sport & Exercise Psychology, 20*, 339–357.

Daley, A. J., & Parfitt, G. (1996). Good health is it worth it? Mood states, physical well-being, job satisfaction, and absenteeism in members and non-members of a British corporate health and fitness club. *Journal of Occupational and Organizational Psychology, 69*, 121–134. doi:10.1111/j.2044-8325.1996.tb00604.x.

Deci, E., & Ryan, R. (1991). A motivational approach to self: integration in personality. In R. Dienstbier (Ed.), *Nebraska symposium on motivation. Perspectives on motivation, Vol. 38* (pp. 237–288). Lincoln: University of Nebraska Press.

Deci, E., & Ryan, R. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. doi:10.1207/S15327965PLI1104_01.

Department of the Air Force. (2006). *Fitness program*. Air Force Instruction 10-248. Retrieved from. http://www.af.mil/shared/media/epubs/AFI10-248.pdf.

Furnham, A., & Calnan, A. (1998). Eating disturbances, self-esteem, reasons for exercising and body weight dissatisfaction in adolescent males. *European Eating Disorders Review, 6*, 58–72.

Gallup, Inc., & Healthways, Inc. (2009). *Well-being index*. Retrieved from. http://www.well-beingindex.com/default.asp.

Garner, D. (1997). The body image survey. *Psychology Today, 30*, 17.

Gaudiano, N. (2005). *A program fit for changes*. Air Force Times. Retrieved from. http://www.airforcetimes.com/legacy/new/0-airpaper-715024.php.

Greif, H., Kreitler, S., Kaplinsky, E., Behar, S., & Scheinowitz, S. (1995). The effects of short-term exercise on the cognitive orientation for health and adjustment in myocardial infarction patients. *Behavioral Medicine, 21*, 75. doi:10.1080/08964289.1995.9933746.

Hagger, M., & Chatzisarantis, N. (2007). *Intrinsic motivation and self-determination in exercise and sport*. Champaign, IL: Human Kinetics Publishers.

Harlow, H. (1953). Mice, monkeys, men, and motives. *Psychological Review, 60*(1), 23–32.

Hausenblas, H., & Fallon, E. (2006). Exercise and body image: a meta-analysis. *Psychology and Health, 21*, 33–47. doi:10.1080/14768320500105270.

Hoffman, M. (2008). *PT shape up*. Air Force Times. Retrieved from. http://airforcetimes.com/news/2009/02/airforce_waist_measurement_020709w/.

Hoffman, M. (2010). *Early PT test scores show 1 in 4 will fail*. Air Force Times. Retrieved from. http://www.airforcetimes.com/news/2010/05/airforce_PT_051610/.

Ingledew, D., & Markland, D. (2008). The role of motives in exercise participation. *Psychology & Health, 23*, 807–828. doi:10.1080/08870440701405704.

Ingledew, D., Markland, D., & Medley, A. (1998). Exercise motives and stages of change. *Journal of Health Psychology, 3*(4), 477–489. doi:10.1177/135910539800300403.

Jonason, P. (2007). An evolutionary psychology perspective on sex differences in exercise behaviors and motivations. *Journal of Social Psychology, 147*, 5–14.

Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54*(2), 87–94.

Kingston, K., Horrocks, C., & Hanton, S. (2006). Do multidimensional intrinsic and extrinsic motivation profiles discriminate between athlete scholarship status and gender? *European Journal of Sport Science, 6*(1). doi:10.1080/17461390500440889, 53–63 (11).

Lustyk, K., Widman, L., Paschane, A., & Olson, K. (2004). Physical activity and quality of life: assessing the influence of activity frequency, intensity, volume, and motives. *Behavior Medicine, 30*, 124–132.

Lutz, R., Lochbaum, M., Carson, T., Jackson, S., Greenwood, M., & Byars, A. (2008). Are we underestimating the affective benefits of exercise? An experience sampling study of university aerobics participants. *Journal of Sport Behavior, 31*(2), 166–186.

Maltby, J., & Day, L. (2001). The relationship between exercise motives and psychological well-being. *Journal of Psychology, 135*(6), 651–660. doi:10.1080/00223980109603726.

Matheson, H., & Crawford-Wright, A. (2000). An examination of eating disorder profiles in student obligatory and non-obligatory exercisers. *Journal of Sport Behavior, 23*, 42.

Mendes, E. (2009). In U.S., nearly half exercise less than three days a week. *Gallup Poll Briefing*1, Retrieved from. http://www.gallup.com/poll/118570/Nearly-Half-Exercise-Less-Three-Days-Week.aspx.

Mond, J., Hay, P., Rodgers, B., Owen, C., & Beumont, P. (2004). Relationships between exercise behavior, eating-disordered behavior and quality of life in a community sample of women: when is exercise excessive? *European Eating Disorders Review, 12*(4), 265–272. doi:10.1002/erv.579.

Moreno, J., Gonzales-Cutre, D., Sicilia, A., & Spray, C. (2010). Motivation in the exercise setting: integrating constructs from the approach—avoidance and achievement goal framework and self-determination theory. *Psychology of Sport and Exercise, 11*(6), 542–550. doi:10.1016/j.psychsport.2010.06.003.

Mullan, E., Markland, D., & Ingledew, D. (1997). A graded conceptualization of self-determination in the regulation of exercise behavior: development of a measure using confirmatory factor analysis procedures. *Personality and Individual, 23*(5), 745–752. doi:10.1016/S0191-8869(97)00107-4.

Polivy, J. (1994). Physical activity, fitness, and compulsive behaviors. In C. Bouchard, R. Shepard, & Stevens. (Eds.), *Physical activity, fitness, and health: International proceedings and consensus statement* (pp. 883–897). Human Kinetics.

Rendi, M., Szabo, A., Szaboo, T., Velenczei, A., & Kovacs, A. (2008). Acute psychological benefits of aerobic exercise: a field study into the effects of exercise characteristics. *Psychology, Health and Medicine, 1*, 180–184. doi:10.1080/13548500701426729.

Rhea, D. (1998). Physical activity and body image of female adolescents: moving toward the 21st century. *The Journal of Physical Education, Recreation, and Dance, 69*.

Ryan, M. (2008). The antidepressant effects of physical activity: mediating self-esteem and self-efficacy mechanisms. *Psychology and Health, 23*, 279–307. doi:10.1080/14768320601185502.

Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. doi:10.1037/0003-066X.55.1.68.

Ryan, R., Williams, G., Patrick, G., & Deci, E. (2009). Self-determination theory and physical activity: the dynamics of motivation in development and wellness. *Hellenic Journal of Psychology, 6*, 107–124.

Sebire, S., Standage, M., & Vansteenkiste, M. (2009). Examining intrinsic versus extrinsic exercise goals: cognitive, affective, and behavioral outcomes. *Journal of Sport & Exercise Psychology, 31*(2), 189–210.

Silberstein, L., Striegel-Moore, R., Timko, C., & Rodin, F. (1988). Behavioral and psychological implications of body dissatisfaction: do men and women differ? *Sex Roles, 19*, 219–233.

Standage, M., Sebire, S., & Loney, T. (2008). Does exercise motivation predict engagement in objectively assessed bouts of moderate-intensity exercise? A self-determination theory perspective. *Journal of Sport & Exercise Psychology, 30*, 337–352.

Stroth, S., Hille, K., Spitzer, M., & Reinhardt, R. (2009). Aerobic endurance exercise benefits memory and affect in young adults. *Neuropsychological Rehabilitation, 19*, 223–247. doi:10.1080/09602010802091183.

Taylor, M., Markham, A., Reis, J., Padilla, G., Potterat, E., Drummond, S., et al. (2008). Physical fitness influences stress reactions to extreme military training. *Military Medicine, 173*(8), 738–742.

In U.S., nearly half exercise less than three days a week. (2009). *Wellness junction*. Retrieved 09.12.09 from. www.wellnessjunction.com/athome/exercise/gallup.htm.

Vansteenkiste, M., Lens, W., & Deci, E. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: another look at the quality of academic motivation. *Educational Psychologist, 41*(1), 19–31. doi:10.1207/s15326985ep4101_4.

Wilson, P., & Rodgers, W. (2004). The relationship between perceived autonomy support, exercise regulations and behavioral intentions in women. *Psychology of Sport and Exercise, 5*(3), 229–242. doi:10.1016/S1469-0292(03)00003-7.

Wilson, P., Rodgers, W., & Fraser, S. (2002). Examining the psychometric properties of the Behavioral Regulation in Exercise Questionnaire. *Measurement in Physical Education and Exercise Science, 6*, 1–21. doi:10.1207/S15327841MPEE0601_1.