ACTIVE EMPLOYEES! EXPLORING THE RELATIONSHIP BETWEEN JOB
CHARACTERISTICS, PERCEIVED CONSTRAINTS AND PARTICIPATION IN
LEISURE-TIME PHYSICAL ACTIVITY

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A thesis submitted to the faculty of the University of North Carolina at Chapel Hill in partial
fulfillment of the requirements for the degree of Masters of Science in Recreation
Administration in the Department of Exercise and Sport Science.

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ABSTRACT

PAUL M. DUNLOP: Active Employees! Exploring the Relationship Between Job Characteristics, Perceived Constraints and Participation in Leisure-time Physical Activity

(Under the direction of Dr. Diane Groff)

Research has suggested that many adults do not participate in enough physical activity to achieve the associated health benefits. Compounding the problem of inactive leisure behaviors, modern workplace duties have also become less active. This study examined patterns of leisure-time physical activity (LTPA) and perceived constraints as related to job characteristics of 382 employees. Less than 8% of participants met the current physical activity recommendations. Females perceived a greater overall effect of constraints than males. Blue-collar workers perceived a greater effect of constraints than white-collar workers. A number of constraints dimensions significantly blocked participation. A number of strategies to encourage LTPA are presented, specifically including the removal or negotiation of time, individual/psychological and accessibility constraint dimensions.

Keywords:

*Job Characteristics, Perceived Constraints, Leisure-time Physical Activity*
To wife Kelly, whose belief in me and continued support and encouragement made this all possible. To all my friends and family who continue to inspire me.
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CHAPTER I
INTRODUCTION

A large body of research has documented the powerful health benefits of regular participation in physical activity, as well as the severe health detriments of sedentary lifestyles (Barengo et al., 2004; Bouchard, 2001; Gundy et al., 1999; Halbert et al, 2000; Sothern et al., 1999). Some of the common benefits of regular exercise include: reduced risk of dying prematurely and reduced likelihood of developing heart disease, colon cancer and type II diabetes. Furthermore, regular exercise can aid the prevention or reduction of hypertension and osteoporosis, and lead to improved psychological well-being (World Health Organization, 2003). Research has also revealed workplace/economic benefits including reduced health care costs, increased productivity, and healthier social environments from regular employee participation in physical activity (Katzmarzyk, Gledhill & Shephard, 2000). In the most recent national survey it was estimated that more than 50% of American adults do not participate in enough physical activity to achieve the associated health benefits, and 25% of adults are not active at all in their leisure time despite these established benefits (U.S. Department of Health and Human Services, 1996). With the benefits and rates of inactivity in mind, it is currently recommended that: (1) Adults should engage in moderate-intensity physical activities for at least 30 minutes on five or more days of the week (Centers for Disease Control and Prevention/American College of Sports Medicine, 2005), or (2) engage in vigorous-intensity physical activity three or more days per week for 20 minutes or
more minutes per occasion (Healthy People 2010/Centers for Disease Control and Prevention, 2005).

Rates of inactivity are especially evident among the following demographic groups: (1) women, (2) older persons, (3) African Americans, and (4) Mexican Americans (Crespo, Keteyian, Heath & Sempos, 1996). Pratt, Macera & Blanton (1999) and Ransdell & Wells (1998) found that the prevalence of non-participation in leisure-time physical activity (LTPA) for adults aged 20 years or older was 22%. The rate was higher in women (27%) than in men (17%). These estimates of participation in regular physical activity were derived from three national surveys of adults. Ransdell & Wells (1998) also concluded that only 8% of African-American women, 11% of Mexican-American women, and 13% of white women participated in the level of physical activity recommended by the surgeon general (moderate to vigorous physical activity most days of the week for at least 30 min). Women of color, women over 40, and women without a college education had the lowest levels of LTPA. The authors suggest health efforts to increase physical activity be focused on women of color, women over 40, and women without a college degree. Research suggests indicators of social class do not seem to explain the higher prevalence of physical inactivity during leisure time amongst African-American and Mexican-American (Crespo, et al., 2000). “Many Americans are inactive or irregularly active during their leisure time…. Intervention strategies meant to promote lifetime physical activities among all Americans represents a major health priority” (Pratt et al., 1999, p.526).

Compounding the prevalence of sedentary leisure-time behaviors, the majority of workplace environments have also become considerably less physically active. The vast
majority of jobs are now in the provision of services rather than the production of goods (Kelly & Godbey, 1992). It can be postulated that the negative health impact of more sedentary workplaces may be offset by leisure-time physical activity (LTPA). However, national surveys have indicated that for a very large portion of the population, rates of LTPA are low and thus unlikely to counteract the negative health impact. The promotion of recreational physical activity at the workplace can be considered a significant and growing concern to public health (Shain & Kramer, 2004). Ways to promote or encourage LTPA often include the removal of barriers or constraints that limit or prohibit participation.

**Definition of Terms**

Leisure-time physical activity (LTPA) is term synonymous with recreational physical activity and encompasses most exercise activities. It does not include occupational, domestic or incidental physical activity. LTPA was operationally defined by utilizing the Department of Health and Human Services (1996) definition of: “purposeful recreational activities such as; walking for exercise, recreational sports, jogging or running, bicycle riding, weight lifting, stair climbing and swimming”.
CHAPTER II
REVIEW OF LITERATURE

Constraints to Leisure-time Physical Activity

Crawford and Godbey (1987) originally categorized constraints to leisure into three distinct categories according to the way they affect the relationship between preference and participation: intrapersonal, interpersonal and structural constraints. Intrapersonal constraints involve “individual psychological states and attributes” (p.122), whereas interpersonal constraints are “the result of interpersonal interaction or the relationship between individuals’ characteristics” (p. 123). Finally, structural constraints are defined as “intervening factors between leisure preference and participation” (p. 124). In an attempt to further understand the relationship between the different constraint dimensions, Crawford, Jackson and Godbey (1991) further refined their original concept of constraints by proposing a hierarchal decision-making process known as the “hierarchy of importance” proposition. The model identified intrapersonal constraints as the most proximal and most powerful of the three dimensions of constraints. Interpersonal constraints represented the next level of importance in the hierarchy and finally, structural constraints were considered to be the most distal and least powerful of three dimensions. Figure 1 presents a graphical illustration of the directionality of the hierarchal model:
Jackson, Crawford and Godbey (1993) made further propositions based on the hierarchal model of importance. The negotiation process suggested six propositions, beginning with most basic premise: (1) “participation is dependent not on the absence of constraints (although this may be true for some people), but on negotiation through them. Such negotiations may modify rather than foreclose participation” (p. 4). The negotiation proposition recognized that the relationship between constraints and participation is not necessarily a clear cause-and-effect relationship. In the original model, either a constraint exerts an effect or it does not, without recognition of its potential gradient or intensity. When a constraint is encountered, the outcome is assumed to be non-participation. This conception does not allow for participation that may occur despite constraint (Jackson et al., 1993). In recognizing that constraints and participation is not an all-or-nothing phenomenon, Jackson et al. (1993) developed these five further propositions within the negotiation concept: (2) variations in the reporting of constraints can be viewed not only as variations in the experience of constraints but also as variations in success in negotiating them; (3) absence of the desire to increase the range of leisure participation may be partly explained by the prior successful negotiation of intervening constraints; (4)
both the initiation and outcome of the negotiation process are dependent on the relative strength of, and interactions between, constraints on participating in an activity and motivations for such participation; (5) anticipation of one or more insurmountable intervening constraints may suppress the desire for participation; and (6) anticipation consists not simply of the anticipation of the presence or intensity of a constraint, but also of anticipation of the ability to negotiate it. Modified levels of participation can therefore be expected despite the perception of a number of constraints. In this instance, constraints can be conceptualized as a basic cost and benefit decision-making process. In other words, the decision to participate in a leisure-time physical activity will be determined by comparing the expected benefits from participation with the expected opportunity costs of time and energy.

A variety of studies have provided evidence for the multidimensionality of the concept of leisure constraints, and most of them have reported similar patterns of constraint dimensions and participation (e.g., Jackson, 1993; Jackson & Henderson, 1995; Alexandris, Barkoukis, Tsorbatzoudis & Grouios, 2003). A study by Hubbard & Mannell (2001) assessed leisure constraint negotiation processes in a corporate employee recreation setting. They found that the perception of constraints decreased the level of participation in physical activity for some employees; however this did not necessarily modify participation for others. In fact, employees experiencing more constraints often made greater use of negotiation resources, and participated in as much physical activity in their leisure-time as desired. Previous research has also revealed various demographic differences in the perception of constraints. Jackson & Henderson (1995) and Raymore et al. (1994) both found that females were more constrained than males. Explanations
concluded that females were more likely to be intrapersonally constrained in the areas of shyness, self-consciousness, lack of skills and lack of knowledge and therefore experienced a greater blocking effect. Searle & Jackson (1985) also suggested that the perception of constraints decreases with level of education achieved.

Studies have confirmed Crawford, Jackson & Godbey’s (1991) proposition that intrapersonal constraints are most influential, dominant and consequently most difficult to overcome. Alexandris & Carroll (1997) indicated that intrapersonal constraints are most likely to block participation in recreational physical activities during leisure-time. Other studies have also confirmed that structural constraints generate the least amount of influence (Hubbard & Mannell, 2001).

Despite extensive research, the concept of constraints is still not fully understood. There is no known threshold of constraints, nor is the negotiation process uniform for all persons. It is known that the constraint dimensions established by Jackson & Crawford (1987) do exist, and that the hierarchal model of influence is present for most persons. People negotiate constraints in different ways and the perception of constraints does not completely block participation, nor can we predict participation based on the perception of constraints. This study sought to examine the specific constraints that apply to employees and suggest ways to modify services to encourage more participation in leisure-time physical activity. “When managers have a more complete understanding of what obstacles impede the use of their services, they will be in a position to take necessary corrective actions” (Howard & Crompton, 1984, p.43).
Trends in Work and Leisure

Three theories regarding the interaction between work and leisure attitudes have been presented in the literature (Gordon, Gaitz & Scott, 1976; Kirkcaldy & Cooper, 1993). The first supposition, known as compensatory theory, supposes an inverse relationship between physical job demands and LTPA; the worker [employee] in a job with low physical demands should be expected to appreciate the benefits of exercise and activity in his leisure time (Wu & Powell, 2000). Conversely, in an occupation that is very physically demanding, the employee is expected to appreciate rest and inactivity in his leisure-time. As the title of the theory suggests, employees are simply expected to compensate for high or low levels of occupational physical activity with high or low levels of leisure-time physical activity.

The generalization theory supposes a positive relationship between work and leisure attitudes. According to the generalization theory, employees that exert considerable physical efforts in their work should be expected to participate in greater amounts of physical activity in their leisure time (Wu & Powell, 2000). For example, the employee that is physically active at the workplace is also more likely to carry-over the behavior and be physically active in his leisure time. Conversely, the employee that is sedentary at the workplace is more likely to be sedentary in his leisure time. As the title of this theory suggests, occupational physical activity behaviors are simply expected to generalize to leisure-time activity behaviors.

Finally, according to the segmentation theory, leisure preferences and work represent independent, unrelated, or neutral areas. In other words, the theory predicts no association between job characteristics and participation in leisure-time physical activity.
Multiple authors have suggested that workers are spending more time at the workplace than ever before (Bond, Galinsky, & Swanberg, 1997; Mishel, Bernstein, & Schmitt, 1999; Schor, 1991). Increases in the time spent at work have been most recognizable amid females, older people and married persons. These demographic groups now account for a large portion of workers in American society. The largest increase in working time can be witnessed among dual-earner couples, which also constitute the fastest growing group of employees nationwide. The average couple devoted 81.3 hours per week in paid employment in 2001, up more than three hours per week from the 78.0 hours per week reported in 1970. The proportion also reporting very long workweeks (48 hours or more) rose sharply from 8.7% in 1970 to 14.4% in 2001” (Jacobs & Gerson, 2001). Due to the increase in time spent at work, it could be postulated that employee time for leisure is becoming less and less.

In combination with technological developments, the shift in employment trends has contributed greatly to the reduction of physical activity in the workplace for the general public. The majority of new occupations are generally sedentary and require the employee to exert minimal physical effort. Research on the relationship between work and LTPA has generated mixed results. A study by Desmond, Conrad, Montgomery, and Simon (1993) indicated that male blue-collar workers participated in more leisure-time physical activities than male white-collar employees. Blue-collar and white-collar occupations were classified according to the Standard Occupational Classification Manual of the US Department of Commerce (1980). These findings support the generalization theory in that blue-collar workers, who were more likely to be physically active at work, were also more physically active in their leisure-time. A study by
Oldridge (1982) however, found that blue-collar workers, regardless of gender, were less likely than white-collar workers to engage in vigorous physical activities during their leisure-time. The findings of this study would support the compensatory theory in that sedentary employees are more likely to be physically active during their leisure-time. Similarly, Ford (1991) found differences between respondents of different socioeconomic class and participation in LTPA. Higher status women spent significantly more time each week performing leisure-time physical activity, job-related physical activity, and household physical activity than did lower status women. Lower status men spent significantly more time each week walking and doing household chores, and higher status men engaged in more leisure-time physical activity.

In the most recent study, Wu & Powell (2000) found that the variable ‘job physical requirements’ was positively associated with greater light physical activity during leisure-time for white-collar workers but not for blue-collar workers. Conversely, they found that only blue-collar workers with higher job physical requirements were more likely to do vigorous exercise during leisure-time. The physical requirements of the job was not associated with the level of vigorous exercise reported by white-collar workers. Due to complexities associated with the nature of work in various occupations in their study, they did not report a simple conclusion but rather stated that their results were most supportive of the generalization theory. They also suggested that stress seems to produce different effects on white-collar and blue-collar worker’s exercise behavior. They found that white-collar workers who reported higher levels of stress were more likely to engage in regular light physical activity. Vigorous physical activity was not associated with stress for white-collar workers. Among blue-collar workers however,
those reporting higher levels of stress were more likely to engage in vigorous physical activity. According to Wu & Powell (2000), the lack of conclusive research and variances in methodological practices make it difficult to make any inferences on which theory is more predominant. As such, the authors suggest using the following variables to characterize the multidimensional aspects of employment: physical requirements, the degree of stress associated with the job, and white-collar versus blue-collar occupational classification. These variables should permit the distinction between physical and mental dimensions of the job from the social status associated with the occupation.

Understanding the relationship between work and leisure, and why some employees choose to participate in exercise and physical activity when others do not, can be considered a key concern to workplace administrators and service providers. This study explored the relationship between perceived constraints, job characteristics and LTPA, attempting to establish a better understanding of the factors that influence participation or non-participation in LTPA. The results are considered and ways to improve workplace programming and marketing of services to encourage physical activity during leisure-time are offered.

Research Questions

The research questions central to the study include:

1. What is the relationship between demographic characteristics and participation in LTPA?
2. What is the relationship between job characteristics and participation in LTPA?
3. What is the relationship between perceived leisure constraint dimensions and participation in LTPA?
4. What is the combined or interactive relationship of job characteristics and perceived leisure constraint dimensions with participation in LTPA?
CHAPTER III
METHODOLOGY

Participants and Sampling

Participants in the study consisted of full-time employees of the University of the North Carolina at Chapel Hill (UNC-CH). Full-time employees were defined as either EPA (exempt from State personnel act) or SPA (subject to State personnel act) employees. There are approximately 10,163 full-time employees of the University (UNC-CH Office of Institutional Research and Assessment, 2004), including faculty and staff positions and most research, instructional, and senior administrative positions. A random sample of full-time staff and faculty was generated from the UNC-CH faculty/staff Campus Directory. An electronic mailing was distributed to 4,210 randomly selected participants with a hyperlink to the survey. The survey was posted on an independent survey publishing website. In order to entice employees to participate, a one-year membership to the Campus Recreation facilities was given away in a grand prize drawing. The incentive was valued at $120.00. The study was approved by the Institutional Review Board of the University of North Carolina at Chapel Hill. Informed consent to participate in the study was obtained from all participants by providing an information sheet and allowing potential subjects to freely choose to participate in the study or not.

Of the 4,210 electronic mailings distributed to the random sample of University employees, 409 responses were collected. Of those, 366 were deemed usable. An additional
22 participants were face-to-face recruited (stratified sample) from the Facilities and Maintenance division. These participants were recruited in an attempt to increase the number of blue-collar workers included in the sample. There was a total of 382 participants in the study (\(N = 382\)).

The sample consisted of more females (\(n = 211, 55.2\%\)) than males (\(n = 171, 44.8\%\)).

Table 1 & 2 illustrates the sample and population gender distribution by the variables ‘age group’ and ‘ethnic background’.

Table 1:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Sample</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>18-25</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>26-35</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>36-45</td>
<td>50</td>
<td>59</td>
</tr>
<tr>
<td>46-55</td>
<td>48</td>
<td>56</td>
</tr>
<tr>
<td>56-65</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td>66+</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>171</td>
<td>211</td>
</tr>
</tbody>
</table>

n/a: Age information was not available on the population.

As can be seen from Table 1, there was a normal distribution of age groupings within the sample. The age ranged from 18 – 68, the slight majority were aged between 36-45 (\(n = 109, 28.5\%\)). The distribution of males and females was similar in the sample and population.

Table 2 (below) illustrates that the vast majority of participants were White (\(n = 292, 76.4\%\)), followed by African-American (\(n = 62, 16\%\)), Hispanic (\(n = 13, 3\%\)), Asian or Pacific Islander (\(n = 9, 2\%\)), and other (\(n = 6, 1\%\)). The sample was generally well educated (46.1% of participants had achieved a graduate or professional degree).
Table 2:
Distribution of Ethnic Backgrounds by Gender

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Sample</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>White</td>
<td>116</td>
<td>176</td>
</tr>
<tr>
<td>African-American</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>171</td>
<td>211</td>
</tr>
</tbody>
</table>

Procedure

Participants in the sample were asked to complete a self-administered online survey that collected data on the following variables:

- Participation in leisure-time physical activity
- Perceived constraints to participation in leisure-time physical activities
- Demographic Information (including: age, gender, ethnic background & highest level of education)
- Occupational characteristics

See appendix 1 for full description of the questionnaire.

Instrumentation

*Leisure-time Physical Activity*

Leisure-time physical activity (LTPA) is synonymous with recreational physical activity and encompasses most exercise activities. It does not include occupational, domestic
or incidental physical activity. LTPA was operationally defined by utilizing the Department of Health and Human Services (1996) definition of: “purposeful recreational activities such as; walking for exercise, recreational sports, jogging or running, bicycle riding, weight lifting, stair climbing and swimming”. The variable was measured using the ‘recreation, sport, and leisure-time physical activity’ subscale of the ‘International Physical Activity Questionnaire’ (IPAQ) (World Health Organization, 2000). The subscale collected information on all leisure-time physical activities in which the respondent had participated in the last seven days. The past seven day time period has been evidenced to be a reliable and valid time frame to assess habitual leisure-time physical activity (Blair et al., 1985).

Specific information on days per week and time spent per episode of walking, participating in vigorous and moderate physical activities was collected. The subscale is recommended as a viable method of monitoring population levels of LTPA globally for populations 18-69 years of age (Craig et al., 2003). An internal consistency reliability score for the subscale was reported to range from 0.76 to 1.00, which is satisfactory (Craig et al., 2003). In the same report, criterion validity of the subscale (as related to caloric expenditure in METS) was reported as 0.26-0.39. Although this might be considered to be a relatively weak score, it is as strong of an indicator as other established self-report instruments (Craig et al., 2003). The questionnaire consisted of a combination of closed and open response questions. Information on the intensity and the length of time spent performing the activity was collected. It should be noted that self-reported methods of participation might suffer from a response error between actual and reported participation (Chase & Harada, 1984). As noted by Alexandris, Tsorbatzoudis & Grouios (2002), self-reported measures of participation have been widely used in studies assessing constraints to leisure (e.g.
Participants were categorized into one of three categories according to the IPAQ scoring system (2005): “inactive”, “minimally active” or “Health Enhancing Physically Active (HEPA)”. Inactive categorization represents the lowest level of physical activity. Those individuals that did not meet the criteria for being minimally active or HEPA are considered to be inactive. Minimally active categorization was achieved by any one of the following criteria:

- Three or more days of vigorous activity of at least 20 minutes per day OR
- Five or more days of moderate-intensity activity or walking of at least 30 minutes per day OR
- Five or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET–mins/week.

HEPA active categorization was achieved by one of the following two criteria:

- Vigorous-intensity activity on at least three days and accumulating at least 1500 MET-mins/week OR
- Seven days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 3000 MET-mins/week.

A continuous score was also calculated and was expressed as MET-mins/week. The following formula was utilized to determine the continuous score: 

\[ \text{Continuous Score} = \text{MET Level} \times \text{Minutes of Activity} \times \text{Events per Week} \]

Walking represented a MET level of 3.3, moderate activities represented 4.0 and vigorous activities represented a level of 8.0 METS.
Perceived leisure constraints

Perceived leisure constraints were measured using an amended version of the ‘Leisure Constraints Scale’ [long format] developed by Alexandris and Carroll (1997). The scale consisted of 29 items classified as constraints by the authors. Participants were asked to evaluate the importance of each of the 29 items as limiting or prohibiting factors to LTPA participation. The scale was selected because it was developed for recreational sport participation, and it does not include other non-physically active leisure activities. The modified scale used a five point Likert scale ranking from strongly agree (1) to strongly disagree (5). Perceived constraints were investigated in relation to actual participation in LTPA for a one-year time period before the investigation. A one-year time period allowed for seasonal variations in LTPA participation.

Factorial validity and reliability of the overall scale were shown to be consistently satisfactory in a series of studies that used general adult populations as well as the older adult population (Alexandris, Barkoukis, Tsorbatzoudis & Groucis, 2003). Internal consistency reliability of the whole scale was reported to be 0.87 (Alexandris & Carroll, 1997b) and consistently satisfactory across three separate studies (Alexandris & Carroll, 1997a; Alexandris & Carroll, 1997b; Alexandris, Tsorbatzoudis & Groucis, 2002).

Job characteristics

Job characteristics were measured using a subscale developed by Wu & Powell (2000). The subscale was modified from the National Health and Retirement Study (1992). The subscale collects information regarding:

- Demographic characteristics (Age, Gender, Education, Ethnic Background)
- Physical demands
• Level of stress associated with the job

The variables ‘physical demands’ and ‘stress’ associated with the job were collected by self-reported subjective assessments by the workers themselves. Previous research has shown the subjective measures similar to those employed in the scale yield empirical relationships with high levels of construct validity (Boey, 1998; Wu & Powell, 2000). The physical demands of the job variable was collected by asking how often the statement “my job requires lots of physical effort” is true. The following responses were offered: (1) none or almost none of the time, (2) some of the time, (3) most of the time, (4) all or almost all of the time.

The variable ‘stress associated with the job’ was derived by posing the following question: “Does your job involve a lot of stress?” The following responses were offered: strongly agree, agree, disagree, or strongly disagree. Strongly disagree was coded as 1, disagree was coded as 2, agree was coded as 3, and strongly agree was coded as 4. These variables should permit the distinction between physical and mental dimensions of the job from the social status associated with the occupation.

Data Analysis

Data was analyzed using the statistical software package SPSS 13.0. Descriptive statistics were utilized to provide a profile of the sample. Inferential statistics were used to determine the relationship between demographic factors, perceived constraints, job characteristics and participation in leisure-time physical activity (LTPA). Analysis of variance and multivariate analysis of variance methods were utilized to identify significant
differences between groups in the perception of constraints and job characteristics as related to LTPA. Tests for significance were performed at the .05 level.

**Delimitations**

Information was collected from full-time employees only. The study was unable to make inferences on employees other than full-time employees of the University. A further delimitation is that the study collected information solely on participation in leisure-time physical activity. The study did not collect information on domestic, transportation and incidental physical activity.

**Limitations**

Due to the much smaller number of blue-collar workers than white-collar workers in the study, it is difficult to make true inferences on significance differences between the two groups.
CHAPTER IV
RESULTS

This chapter describes the data analysis performed for the study and the results obtained as they relate to each research question. The results are presented in the order that the research questions are presented in chapter 1. A variety of descriptive and inferential statistics were utilized to determine relationships between variables.

Demographic Characteristics and Participation in LTPA

Forty six percent of the sample was classified as ‘inactive’ \( (n = 176) \), 46.1% was classified as ‘minimally active’ \( (n = 176) \) and 7.9% was classified as Health Enhancing Physically Active or ‘HEPA’ \( (n = 30) \). The mean MET-mins/week expenditure for the whole sample was 1059. Table 3 presents descriptive statistics related to LTPA and gender.

Table 3:
Demographic Indicators of LTPA

<table>
<thead>
<tr>
<th>IPAQ Categorization</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Inactive</td>
<td>75</td>
<td>101</td>
<td>176</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>80</td>
<td>96</td>
<td>176</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>16</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>MET-mins/week (mean)</td>
<td>1156.73</td>
<td>979.85</td>
<td>n/a</td>
</tr>
<tr>
<td>SD</td>
<td>1143.40</td>
<td>1016.7</td>
<td>n/a</td>
</tr>
</tbody>
</table>
As can be seen from Table 2, 9.4% of males were classified as in the ‘HEPA’ category compared to only 6.6% of females. However, males did not participate in a greater amount of LTPA than females when defined as IPAQ categorization \( (X^2 = 1.25, p = .534) \) or MET-mins/week \( (F = 1.79, p = .130) \). Table 4 presents descriptive statistics related to LTPA and ethnicity.

Table 4:

**Ethnicity as Related to LTPA**

<table>
<thead>
<tr>
<th>IPAQ Categorization</th>
<th>Ethnic Background</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>125</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>139</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>28</td>
</tr>
<tr>
<td>MET-mins/week (mean)</td>
<td>1134.44</td>
</tr>
<tr>
<td>SD</td>
<td>1141.18</td>
</tr>
</tbody>
</table>

As illustrated by table 3, 9.6% of whites were classified in the ‘health enhancing physical activity’ level of LTPA compared to 3.2% of African-Americans. There were no participants classified in this level for Hispanics, Pacific Islander or Asians, or the ‘other’ category. Overall, the were no significant differences between groups. The population of interest was generally very well educated as could be expected from University personnel. More than 46% of participants had achieved a graduate or professional degree. As such the effect of education on LTPA was not considered to be a valuable analysis and was omitted from the study.
Job Characteristics

There were considerably more white-collar workers ($n = 321, 84.0\%$) than blue-collar workers in the study ($n = 61, 16.0\%$). Although specific numbers are unavailable, the proportion of white-collar to blue-collar workers in the sample is anecdotally considered to be similar to that of the population. White-collar workers ($M = 44.27$ hours per week, $SD = 9.41$) spent significantly more time at the workplace performing work-related duties than blue-collar workers ($M = 42.90$ hours per week, $SD = 9.45$) ($t = 9.35$, $df = 380$, $p = .002$). Regardless of job classification, males ($M = 45.68$ hours per week, $SD = 9.21$) spent significantly more time at the workplace than females ($M = 42.73$ hours per week, $SD = 8.54$) ($t = 3.24$, $df = 380$, $p = .001$).

As might have been expected, blue-collar workers reported that their job involved more physical effort than white-collar workers ($X^2 = 221.6$, $p < .001$). Ninety two percent of white-collar workers reported that their job required physical effort ‘none or almost none of the time’ or ‘some of the time.’ Conversely, 91.8% of blue-collar workers reported that their job required physical effort ‘most of the time’ or ‘all or almost all of the time.’ White-collar workers reported that their job involved more stress than blue-collar workers ($X^2 = 49.9$, $p < .001$). Twenty one percent of white-collar workers strongly agreed that their job involved a lot of stress, compared to only 8.2% of blue-collar workers. Overall, white-collar workers were also more likely to be female ($X^2 = 44.3$, $p = <.01$), white ($X^2 = 72.2$, $p = <.01$), and have a greater level of education ($X^2 = 151.1$, $p < .001$) than blue-collar workers.

White-collar workers did not participate in a significantly greater amount of LTPA than blue-collar workers when determined by IPAQ categorization ($X^2 = 4.64$, $p = .098$) or MET-mins/week ($F = 2.98$, $p = .085$). The mean IPAQ categorization for white-collar
workers was 1.62 (SD = 0.65), and 1.57 (SD = 0.53) for blue-collar workers (see table 5). Similarly male white-collar workers did not participate in a significantly greater amount of LTPA than male blue-collar workers when determined by IPAQ categorization ($X^2 = 147.59, p = 0.217$), nor did female white-collar workers participate in a significantly greater amount of LTPA than female blue-collar workers ($X^2 = 13.869, p = .676$). A one-way between-subjects ANCOVA examined the effect of job classification on LTPA (determined by MET-mins/week) covarying out the effect of gender. White-collar workers did not participate in a greater amount of LTPA when determined by MET-mins/week after controlling for gender ($F = 1.75, p = .186$).

Table 5:

Descriptive Statistics for Job Classification, Gender and LTPA

<table>
<thead>
<tr>
<th>IPAQ Categorization</th>
<th>White-Collar Workers</th>
<th>Blue-Collar Workers</th>
<th>Entire Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>55</td>
<td>94</td>
<td>20</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>50</td>
<td>93</td>
<td>30</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>15</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>MET-mins/week (mean)</td>
<td>1259.8</td>
<td>1005.1</td>
<td>914.1</td>
</tr>
<tr>
<td>SD</td>
<td>103.6</td>
<td>71.4</td>
<td>159.1</td>
</tr>
</tbody>
</table>

There was no significant relationship between physical job requirements and LTPA when LTPA was determined by IPAQ categorization. The relationship was significant when LTPA was determined by the continuous score of MET-mins/week ($F = 2.49, p = .05$). In this relationship, workers reporting low amounts of job physical effort were more likely to
expend a greater amount of MET-mins/week than workers reporting greater amounts of physical effort requirements (supporting the compensation theory). There was no significance difference between job physical requirements and LTPA when the effects of gender and job classification were controlled. There was also no significant relationship between job-related stress and LTPA when LTPA was defined by either IPAQ categorization or the continuous score of MET-mins/week and when cases were controlled for gender and job classification. Work related stress did not appear to effect LTPA participation.

Perceived Constraints to LTPA

A principal component analysis was performed on the constraints scale. Components with eigenvalues greater than 1.0 were retained and rotated with both orthogonal and oblique rotations. Both methods of rotation rendered similar results. In a comparable method to Alexandris, Tsorbatzoudis & Grouios (2002), orthogonal rotation was retained for conceptual simplicity and ease of description. The analysis of scale revealed a very clear factor structure. Six factors emerged that accounted for 88% of the variance. The factors were labeled by utilizing categories already established in the literature (Alexandris, et al., 2003; Alexandris et al., 2002; Alexandris & Carrol, 1997). The six factors were defined as: individual/psychological (six items), facilities (four items), lack of partners (three items), time (four items), interest/negative past experiences (three items), accessibility/financial (four items). The value of alpha for all subscales were good, ranging from .83 to .65 (see Table 6). The descriptive statistics indicated that the time dimension was scored highest as a constraint ($M = 2.94$), followed by accessibility dimension ($M = 2.72$). The individual/psychological constraint dimension was the powerful, explaining a substantial
amount of overall variance (34%). Tables 5 and 6 illustrate the results of the component analysis:

Table 6:

Principal Component Analysis of the Constraints Scale, Part 1

(individual/psychological, facilities and lack of partners factors)

<table>
<thead>
<tr>
<th>Individual Items</th>
<th>Psychological</th>
<th>Facilities</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Skill</td>
<td>.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Fitness</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of Confidence</td>
<td>.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Problems</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Self-Image</td>
<td>.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afraid of Injury</td>
<td>.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilities are inadequate</td>
<td>.84</td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td>Dislike Activities Offered</td>
<td></td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>Facilities are poor quality</td>
<td></td>
<td></td>
<td>.84</td>
</tr>
<tr>
<td>Facilities are too crowded</td>
<td></td>
<td></td>
<td>.88</td>
</tr>
<tr>
<td>Friends do not have time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends do not have interest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of partners</td>
<td></td>
<td></td>
<td>.82</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>14.5</td>
<td>3.3</td>
<td>1.9</td>
</tr>
<tr>
<td>% of Variance (cumulative)</td>
<td>34</td>
<td>52</td>
<td>66</td>
</tr>
<tr>
<td>Item Mean</td>
<td>2.01</td>
<td>2.47</td>
<td>2.52</td>
</tr>
<tr>
<td>Alpha</td>
<td>.83</td>
<td>.82</td>
<td>.81</td>
</tr>
</tbody>
</table>
Table 7:
Principal Component Analysis of the Constraints Scale, Part 2
(time, interest and accessibility factors)

<table>
<thead>
<tr>
<th>Individual Items</th>
<th>Time</th>
<th>Interest</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>No time because of work commitments</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No time because family commitments</td>
<td>.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No time because of social commitments</td>
<td>.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dislike the feeling of exercise</td>
<td></td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>No interest</td>
<td></td>
<td>.76</td>
<td></td>
</tr>
<tr>
<td>Negative past experiences</td>
<td></td>
<td></td>
<td>.65</td>
</tr>
<tr>
<td>Too expensive</td>
<td></td>
<td></td>
<td>.79</td>
</tr>
<tr>
<td>Lack of opportunities</td>
<td></td>
<td></td>
<td>.70</td>
</tr>
<tr>
<td>Facility timetable doesn’t fit schedule</td>
<td></td>
<td></td>
<td>.63</td>
</tr>
<tr>
<td>Lack of transportation</td>
<td></td>
<td></td>
<td>.54</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>1.6</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>% of Variance (cumulative)</td>
<td>75</td>
<td>83</td>
<td>89.5</td>
</tr>
<tr>
<td>Item Mean</td>
<td>2.94</td>
<td>1.64</td>
<td>2.72</td>
</tr>
<tr>
<td>Alpha</td>
<td>.65</td>
<td>.67</td>
<td>.66</td>
</tr>
</tbody>
</table>

Gender differences in perception of constraints

A multivariate analysis of variance (MANOVA) revealed that females perceived a greater overall effect of constraints than males (Wilks’ Lambda = .834, $F = 2.94, p < .001$) Follow-up univariate analysis of variance indicated significant gender differences in the facility ($F = 4.50, p = .043$), time ($F = 4.01, p = .008$) and accessibility ($F = 7.07, p < .001$) dimensions. The greatest gender differences were found among the following constraints: lack of time due to social commitments ($F = 9.69, p = .002$), facility timetable not fitting with schedule ($F = 12.92, p < .001$) and being too expensive ($F = 8.44, p = .004$). Females were also more likely than males to perceive self-image (in public) as a constraint to LTPA ($F = 5.51, p = .019$).
Perception of constraints by job characteristics

A multivariate analysis of variance (MANOVA) was carried out to examine job classification differences in the perception of constraints between blue-collar and white-collar workers. The results indicated that blue-collar workers perceived a greater effect of constraints to LTPA (Wilks’ Lambda = .716, $F = 5.87, p < .001$). Follow-up univariate analysis of variance indicated that job classification differences were significant in the interest ($F = 27.40, p < .001$), individual/psychological ($F = 5.72, p < .001$), facilities ($F = 6.03, p < .001$), and accessibility ($F = 2.95, p = .020$) dimensions. Blue-collars were more likely to report dislike of the activities offered as a constraint than white-collar workers ($F = 8.48, p = .004$).

A multivariate analysis of variance (MANOVA) was carried out to examine the relationship between physical job demands and the perception of constraints. The results indicated that workers who reported their job involved a lot of physical effort most or all of the time perceived a greater overall effect of constraints than workers who reported that their job involved physical effort none or almost none of the time (Wilks’ Lambda = .854, $F = 3.37, p < .001$). Follow-up univariate analysis of variance revealed a significant positive relationship with the lack of partners ($F = 1.48, p = .045$) and lack of interest ($F = 4.84, p < .001$).

Perception of constraints by frequency of LTPA participation

There was a significant inverse relationship between the overall perception of constraints and LTPA when determined by IPAQ categorization (Wilks’ Lambda = .743, $F = 2.37, p < .001$). A multivariate analysis of variance revealed a significant inverse relationship between constraint dimensions and LTPA when controlling for both gender

28
and job classification. (Wilks’ Lambda = .864, \( F = 4.72, p < .001 \)). Follow-up univariate analysis of variance indicated significant differences in many constraint dimensions. For females: individual/psychological (\( F = 6.46, p = .002 \)), accessibility (\( F = 3.58, p < .001 \)), facilities (\( F = 3.80, p < .001 \)), time (\( F = 8.15, p < .001 \)), and lack of interest (\( F = 8.39, p < .001 \)). For males: lack of partners (\( F = 6.04, p = .003 \)), accessibility (\( F = 7.93, p < .001 \)), time (\( F = 11.24, p < .001 \)), and lack of interest (\( F = 5.57, p = .005 \)). Tables 8, 9 & 10 display the effects of all constraint dimensions on LTPA (determined by IPAQ Categorization) when controlling for gender. Similarly, Tables 11, 12 & 13 show the effects of constraint dimensions on LTPA when controlling for job classification. There was a significant effect on LTPA by a number of different constraint dimensions. For white-collar workers: time (\( F = 14.47, p < .001 \)), lack of interest (\( F = 14.75, p < .001 \)), individual/psychological (\( F = 7.32, p = .001 \)), lack of partners (\( F = 5.77, p = .003 \)), and Accessibility (\( F = 6.31, p = .002 \)). For blue-collar workers: facilities (\( F = 4.69, p = .013 \)), time (\( F = 6.94, p = .002 \)), individual/psychological (\( F = 3.55, p = .035 \)), lack of partners (\( F = 3.33, p = .043 \)), and accessibility (\( F = 5.61, p = .006 \)).
Table 8:
Effect of Individual/psychological and Lack of Partners Constraint Dimensions on LTPA (Determined by IPAQ Categorization) when Controlling for Gender

<table>
<thead>
<tr>
<th></th>
<th>Individual/ Psychological</th>
<th>Lack of Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>2.08</td>
<td>.633</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>1.88</td>
<td>.641</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>1.75</td>
<td>.548</td>
</tr>
</tbody>
</table>

Univariate F
- \( F = 2.85, \quad p = .061 \)
- \( F = 6.46, \quad p = .002^{**} \)
- \( F = 6.04, \quad p = .003^{**} \)
- \( F = 2.55, \quad p = .081 \)

* The mean difference is significant at the .05 level
** The mean difference is significant at the .01 level
*** The mean difference is significant at the .001 level

Table 9:
Effect of Accessibility and Facilities Constraint Dimensions on LTPA (Determined by IPAQ Categorization) when Controlling for Gender

<table>
<thead>
<tr>
<th></th>
<th>Accessibility</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>2.85</td>
<td>.663</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>2.37</td>
<td>.805</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>2.45</td>
<td>.992</td>
</tr>
</tbody>
</table>

Univariate F
- \( F = 7.93, \quad P = .001^{***} \)
- \( F = 3.58, \quad P < .001^{***} \)
- \( F = 2.14, \quad p = .121 \)
- \( F = 3.8, \quad p < .001^{***} \)

* The mean difference is significant at the .05 level
** The mean difference is significant at the .01 level
*** The mean difference is significant at the .001 level
Table 10:
Effect of Time and Lack of Interest Constraint Dimensions on LTPA (Determined by IPAQ Categorization) when Controlling for Gender

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th>Lack of Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>3.15</td>
<td>.826</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>2.54</td>
<td>.822</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>2.50</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Univariate F

\[ F = 11.24, \quad F = 8.15, \quad F = 5.57, \quad F = 8.39, \]
\[ p < .001^{***} \quad p < .001^{***} \quad p = .005^{**} \quad p < .001^{***} \]

* The mean difference is significant at the .05 level
** The mean difference is significant at the .01 level
*** The mean difference is significant at the .001 level

Table 11:
Effect of Individual/psychological and Lack of Partner Constraint Dimensions on LTPA (Determined by IPAQ Categorization) when Controlling for Job Classification.

<table>
<thead>
<tr>
<th></th>
<th>Individual/ Psychological</th>
<th>Lack of Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White-Collar</td>
<td>Blue-Collar</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>2.11</td>
<td>.725</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>1.84</td>
<td>.775</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>1.65</td>
<td>.507</td>
</tr>
</tbody>
</table>

Univariate F

\[ F = 7.32, \quad F = 3.55, \quad F = 5.77, \quad F = 3.33, \]
\[ p = .001^{***} \quad p = .035^{*} \quad p = .003^{**} \quad p = .043^{*} \]

* The mean difference is significant at the .05 level
** The mean difference is significant at the .01 level
*** The mean difference is significant at the .001 level
Table 12:
Effect of Accessibility and Facilities Constraint Dimensions on LTPA (Determined by IPAQ Categorization) when Controlling for Job Classification.

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-Collar</td>
<td>Blue-Collar</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>2.85</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>2.54</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>2.67</td>
</tr>
</tbody>
</table>

Univariate F
- F = 6.31, p = .002**
- F = 5.61, p = .006**
- F = 2.69, p = .070
- F = 4.69, p = .013*

* The mean difference is significant at the .05 level
** The mean difference is significant at the .01 level
*** The mean difference is significant at the .001 level

Table 13:
Effect of Time and Lack of Interest Constraint Dimensions on LTPA (Determined by IPAQ Categorization) when Controlling for Job Classification.

<table>
<thead>
<tr>
<th>Time</th>
<th>Lack of Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>White-Collar</td>
<td>Blue-Collar</td>
</tr>
<tr>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>(1) Inactive</td>
<td>3.22</td>
</tr>
<tr>
<td>(2) Minimally Active</td>
<td>2.72</td>
</tr>
<tr>
<td>(3) HEPA</td>
<td>2.54</td>
</tr>
</tbody>
</table>

Univariate F
- F = 14.47, p <.001***
- F = 6.94, p = .002**
- F = 14.75, p <.001***
- F = 1.39, p = .257

* The mean difference is significant at the .05 level
** The mean difference is significant at the .01 level
*** The mean difference is significant at the .001 level
Summary of Results

The results uncovered a number of interesting and significant relationships. The factor analysis of the constraints scale revealed a very clear factor structure. The clear factor structure should permit the researcher and practitioners to more easily interpret which constraint dimensions displayed a significant blocking effect on LTPA. It also provided some evidence for the hierarchal level of importance model proposed by Godbey et al (1991) of each. In chapter 5, these findings are further explored by discussing the results in relation to each of the research questions.
SECTION V
DISCUSSION & CONCLUSIONS

The purpose of the study was to explore the relationship between perceived constraints, job characteristics and leisure-time physical activity. The study attempted to establish a better understanding of the factors that influence participation or non-participation in LTPA. Anticipated practical implications to be derived from the study included identifying the most effective methods of improving workplace programming, and how to better market services to encourage physical activity during leisure-time to employees.

The findings clearly support the notion that most adults do not participate in enough leisure-time physical activity. Only 7.9% of sampled employees were categorized in the ‘Health Enhancing Physical Activity’ level, implying that over 92% did not meet the current Surgeon General or Healthy People 2010 physical activity recommendations. Employees in the study were even less active (46.1% inactive) than suggested by the 1996 national survey in which 25% of the overall population was classified as inactive. This alarming information should clearly emphasize the promotion of physical activity as a major concern to recreation and/or university administrators. Demographic indicators of LTPA were difficult to interpret for a variety of reasons. The sample was very well educated as would be expected from a University population. As such it was difficult to make comparisons among levels of education. There were no significant LTPA differences between different age categories or between ethnic backgrounds. These findings are not supportive of some previous research
(e.g. Ransdell & Wells, 1998) that indicated that African-American and Hispanic persons were more likely to be inactive during leisure-time than Whites. The variation between studies may be attributed to the substantially larger representation of Whites (76.4%) than all other ethnicities (24.6%) in the current study. The ethnic breakdown of the sample however, was representative of the overall population.

In the most recent examination of the relationship between work and LTPA, Wu & Powell (2000) found that blue-collar workers were more likely to engage in vigorous physical exercise in their leisure-time than white-collar workers. Despite their suggestion that there are complex issues associated with the nature of work in various occupations that preclude a simple conclusion with regard to the relationship between work and leisure preferences, their study was more supportive of the generalization theory. They found white-collar workers who reported that their job involved greater physical effort were more likely to engage in light physical activity, relative to other white-collar workers. Blue-collar workers that reported the most physical job requirements were also more likely to participate in vigorous LTPA. The findings of the current study however, provided support for the compensation model in that white-collar workers participated in significantly more LTPA than blue-collar workers when determined by MET-mins/week. Sample variances, mainly in the demographic makeup of the populations of interest, may have accounted for these differences between studies. The study by Wu & Powell (2000) assessed employees from multiple companies and organizations whereas the current study analyzed employees from a single organization.

The low number of blue-collar workers represented in the study was problematic and limited statistical power. Nonetheless, the results suggest that blue-collar workers
were significantly less active than white-collar workers and perhaps activity promotion strategies should focus more on these workers. It should be noted that the current findings are similar to that of Oldridge (1982) and Ford (1991). Both studies found support for the compensatory model however; considerable methodological variances limited the ability to make accurate comparisons with the current study. An alternative approach to sampling may have been useful to increase the proportion of blue-collar workers. Blue-collar workers are less likely to have access to the internet or email. A greater representation of blue-collar workers may have been reached through a stratified sample.

Wu & Powell (2000) also found that blue-collar workers in more stressful jobs were more likely to engage in vigorous activity than blue-collar workers in low stress jobs. A similar relationship was not found among white-collar workers. The current study found no relationship between job-related stress and LTPA for either blue-collar or white-collar workers. Again the variances between studies may be explained by sample differences. Overall, regardless of job classification, the results indicated that workers reporting low amounts of job physical effort were more likely to expend a greater amount of MET-mins/week than workers reporting greater amounts of physical effort requirements (providing further support for the compensatory model). This would suggest that the transition from an industrial to service economy is not as problematic as might be expected. However, the sample cannot be considered representative of the general population but rather of University personnel in this geographic region.

The effect of perceived constraints on LTPA confirmed the multidimensionality of the overall concept of constraints. The principal component analysis of the constraints scale revealed a very clear six factor structure that accounted for 86.5% of variance.
Twenty three of the original 29 items were retained in the six factor structure. In three separate studies using the same scale, Alexandris and colleagues found seven factors that accounted of 62.2% of the variance (1997); seven factors accounted of 68% of the variance (2002), and four factors accounted for 82% of the variance (2003). The current factor structure can be considered even more robust than those established by Alexandris et al. Variations in the factor structures between studies are most likely attributed to demographic differences between samples, e.g. the specific population of interest in Alexandris et al (2003) was elderly persons. The six factor structure that emerged in this study was very similar to previous studies (Jackson, 1993; Jackson & Henderson, 1995). Jackson and Henderson (1995) found a six factor structure that included the following dimensions: costs of participating; family and work commitments; facilities; social isolation; geographical isolation; and lack of skills. The six factors that were identified in the current study were individual/psychological, facilities, lack of partners, time, interest/negative past experiences, accessibility/financial.

The study provided evidence for a negative and significant relationship between perception of constraints and frequency of LTPA participation. These findings are dissimilar to some previous studies that rejected the negative relationship between constraints and participation. Shaw, Bonen & McCabe (1991) and Kay & Jackson (1991) found that intervening constraints did not reduce participation. Rather, they found that frequent reporting of constraints was associated with higher rather than lower leisure participation. In these studies participants were successfully able to negotiate constraints. The results of the current study are in direct contrast to these. The significant blocking effect of constraints in the current study have been confirmed in numerous studies.

Overall the perception of constraints varied among groups but the constraining factors that blocked participation for most individuals included the individual/psychological, time and accessibility dimensions. These findings have many practical implications. The individual/psychological constraint dimension has been conceptualized as an intrapersonal constraint (Crawford & Godbey, 1987) and according to the hierarchal model, is most likely to block participation (Crawford, Jackson & Godbey, 1991). Overcoming intrapersonal constraints with promotion or marketing efforts is generally most problematic for administrators or service providers due to the individualistic nature of such a constraint dimension. Practical implications from these findings might include developing promotional strategies that encourage internal motivation. Providing health and wellness education as related to physical activity may be one method of providing individuals with internal motivation.

The negative relationship between LTPA and the time dimension is also of concern. As noted by Carroll & Alexandris (1997), time has often been categorized as a structural constraint in the literature. As a structural constraint, we should not expect time to be among the most powerful determinants of LTPA. Carroll & Alexandris (1997) however, found time to be one of the more powerful constraint dimensions. In offering some explanation for this finding, they suggested that time related constraints can be considered both a structural and intrapersonal constraint. Opening hours and difficulty matching facility timetables are very obvious external constraints. Time however, can be intrapersonally constraining by one’s self-designed priorities and preferred schedules.
This would account for the significant blocking effect of the time dimension. Practical implications concerning this information include developing strategies to remove or negotiate this constraint. Examples might include offering more flexible work schedules or extra time to participate in physical activity. Furthermore, promotional or marketing efforts might focus on the fact that health benefits can be achieved without very long extensive bouts of exercise.

The next most constraining factor to LTPA was the accessibility/financial dimension. This dimension has traditionally been conceptualized as a structural constraint and it is therefore surprising to have displayed such a blocking effect. However, further analysis of the sample and nature of the University Campus may provide sound explanation for this phenomenon. Lack of transportation and parking consistently displayed significant blocking effects across a large portion of the sample regardless of gender or job classification. This information is clear evidence for the need to either reduce or eliminate the cost of using recreation services and increase the availability of parking.

The results revealed some very interesting findings with regard to the blocking effect of perceived constraint dimensions when co-varying out the effect of gender and job classification. Individual/psychological factors ($F = 6.46, p = .002$) and facilities ($F = 3.80, p < .001$) were significant blocking factors for females but not for males: Conversely, the lack of partners ($F = 6.04, p = .003$) had a significant blocking effect for males and not for females. These findings are useful for the development of target market segments in promotional or marketing efforts. In other words, the data suggests the promotion of buddy or partner programs would be a key marketing concern when
reaching males. The results also revealed that the following constraint dimensions were significant participation blocking factors for blue-collar workers but not for white-collar workers: facilities \((F = 4.69, p = .013)\) and lack of partners \((F = 3.33, p = .043)\). Lack of interest \((F = 14.75, p < .001)\) was a produced a significant blocking effect for white-collar workers and not for blue-collar workers. The findings support the concepts developed by Jackson & Henderson (1995) that women are more constrained to leisure than men.

Summary

The study revealed many interesting findings that have many practical implications. With the rates of inactivity displayed in the current study, the promotion of physical activity should be a very considerable concern to both university and recreation administrators. The vast majority of employees did not meet the current recommendations for physical activity. The relationship between job characteristics and participation in leisure-time physical activity is complex and not easily interpreted. The current study provided evidence for the compensatory model in that white-collar workers who reported low or no physical job requirements were more likely to engage in a greater amount of LTPA. It is difficult to say with confidence that employees were either purposely and non-purposely compensating for their job characteristics with LTPA. However, the study would suggest that for the current population, blue-collar workers warrant greater attention from recreation administrators.

The negative and significant relationship between perception of certain constraints and frequency of LTPA participation provided evidence for the hierarchal model of importance proposed by Crawford, Jackson and Godbey (1991). The results
would suggest that removing or encouraging the negotiation of the individual/
psychological, time and accessibility dimensions is most important for administrators. The results also revealed interesting relationships between constraint dimensions and LTPA when controlling for both gender and job classification. These results suggest that each group is clearly not homogenous and that general marketing strategies may not meet the needs of certain groups. For example, females experienced a significant blocking effect by perceiving facilities to be inadequate or overcrowded, whereas men did not. Similarly, lack of interest was a significant blocking factor for blue-collar workers and not for white-collar workers. Perhaps white-collar workers were more educated about the benefits of physical activity and were better able to negotiate lack of interest because of such knowledge.

Overall the results suggest how strategies might be most successful in tackling such an inactivity pandemic. It is crucial that administrators focus marketing and promotion strategies to better reach university employees. The information generated from the study will also aid the development of target markets. In closing, it is clear that “when managers have a more complete understanding of what obstacles impede the use of their services, they will be in a position to take necessary corrective actions” (Howard & Crompton, 1984, p.43).

Implications for Future Research

As the current study and previous research, such as the National Physical Activity Survey (1996) has shown, there is a very clear need to promote and encourage regular exercise and physical activity for the general population. The results of the current study have indicated how constraints can be perceived very differently among varying groups.
of people. It also suggests that blue-collar workers are more likely to be inactive in their leisure time than white-collar workers. It is difficult to make generalizations due to the demographic makeup of the sample, and indeed the specific population of interest. With this in mind, the researcher proposes the following considerations for future research; studies should focus on the general population and assess employees from various employers and industries. A large cohort would be most beneficial to further explore the complex relationship between job characteristics, perceived constraints and leisure-time physical activity. Furthermore, the method of recruiting subjects in the current study could be improved. The random sample was generated from the University’s campus email directory. This limited the number of potential subjects because not all University employees are issued an email account or have access to the internet. Further face-to-face recruiting would have increased the number of blue-collar workers in the study.
Appendix 1:

Participant Survey

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### Active Employees!

#### 1. Welcome

You have been randomly invited to participate in a research study of leisure-time physical activity habits of UNC-Chapel Hill employees. Your participation in this study is completely voluntary. The purpose of the study is to examine the relationship between job characteristics, perceived constraints and participation in leisure-time physical activity. Participation in the study is limited to full-time employees of the University of North Carolina at Chapel Hill only. Information gathered from the study will be used to help improve recreational services for employees.

The term leisure-time physical activity is synonymous with recreational physical activity and encompasses most exercise activities. It does not include occupational, domestic or incidental physical activity. Think of it as "purposeful recreational activities such as; walking for exercise, recreational sports, jogging or running, bicycle riding, weight lifting, stair climbing and swimming".

This research is part of a Masters Thesis in the department of Exercise and Sport Science. The title of the study is: Active Employees! The relationship between job characteristics, perceived constraints and participation in leisure-time physical activity.

Please note that if you wish to be entered in the drawing for FREE gym and pool privileges for the next year you will be required to enter your contact details in the final section of the survey. Contact details will remain completely secure and will not be available to anyone.
Active Employees!

2. Job Characteristics

This section of the survey will collect information about your current full-time employment with the University of North Carolina at Chapel Hill.

* 1. What is your job title?

2. What department do you work for? Be specific:
Active Employees!

3. Job Characteristics

Thinking of your current full-time employment, please respond to the following statements:

(physical effort & stress are self perceived variables - e.g. do YOU think YOUR job is physically demanding or stressful?)

* 3. My job requires physical effort:

None, or almost none of the time

Some of the time

Most of the time

All, or almost all of the time

* 4. My job involves a lot of stress

Strongly Disagree

Disagree

Agree

Strongly Agree

* 5. How many hours per week do you usually spend at the workplace or performing work-related duties?

<< Prev   Next >>
Active Employees!

4. Basic Demographics

* 6. What is the highest level of education you have attained?

- Junior High School
- High School
- Junior College
- College Graduate
- Graduate School

* 7. Are you male or female?

- Male
- Female

* 8. What is your ethnic background?

- White
- African-American
- Hispanic Origin (any race)
- Pacific Islander or Asian
- Other

* 9. What is your age?

- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66+

<< Prev    Next >>
**Active Employees!**

5. RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

The intent of this part of the survey is to collect data on the amount and types of physical activity that you engage in during your leisure-time. Please think of purposeful, recreational physical activity only.

This section collects information on all the physical activities that you did only in the LAST 7 DAYS solely for recreation, sport, exercise or leisure.

6. Walking for leisure

* 10. During the last 7 days, on how many days did you WALK for at least 10 minutes in your leisure time?

<table>
<thead>
<tr>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>1 Day</td>
</tr>
<tr>
<td>2 Days</td>
</tr>
<tr>
<td>3 Days</td>
</tr>
<tr>
<td>4 Days</td>
</tr>
<tr>
<td>5 Days</td>
</tr>
<tr>
<td>6 Days</td>
</tr>
<tr>
<td>7 Days</td>
</tr>
</tbody>
</table>
11. How much time did you usually spend on one of those days WALKING in your leisure time? (please indicate time in minutes only - use only numbers, not words. For example; insert 90 instead of one and half hours)

12. Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do VIGOROUS physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

- None
- 1 Day
- 2 Days
- 3 Days
- 4 Days
- 5 Days
- 6 Days
- 7 Days

13. How much time did you usually spend on one of those days doing VIGOROUS physical activities in your leisure time? (please indicate time in minutes only - use only numbers, not words. For example; insert 90 instead of one and half hours)
14. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do MODERATE physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your leisure time?

- None
- 1
- 2
- 3
- 4
- 5
- 6
- 7

15. How much time did you usually spend on one of those days doing MODERATE physical activities in your leisure time? (please indicate time in minutes only - use only numbers, not words. For example; insert 90 instead of one and half hours)
Active Employees!

10. Constraints to Physical Activity

People have many reasons for NOT participating in physical activity during their leisure-time. Also, there are factors that prevent one from taking part in physical activities to the extent to which he/she would like. We would like you to evaluate the importance of the following statements as LIMITING OR PROHIBITING factors to your participation in leisure-time physical activities.

* 19. Please evaluate the importance of each individual item as a constraining or limiting factor to your participation in leisure-time physical activity:

<table>
<thead>
<tr>
<th>Agree</th>
<th>Agree</th>
<th>Neither Agree or Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have no interest in exercising or being physically active</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>in exercise programs or the past and I did not like it</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neither Agree or Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------</td>
<td>---------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>I am afraid of getting hurt or injured</td>
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<td></td>
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<tr>
<td>I feel too tired or don't have enough energy</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Reason</td>
<td>Rating</td>
<td></td>
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<tr>
<td>-----------------------------------------------------------------------</td>
<td>--------</td>
<td></td>
<td></td>
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<tr>
<td>I have health problems</td>
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<tr>
<td>I am not fit enough</td>
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<td></td>
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<tr>
<td>I am not skilled enough</td>
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<td></td>
</tr>
<tr>
<td>I do not feel confident to exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not like exercising or being physically active in a public place</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**21. Please evaluate the importance of each individual item as a constraining or limiting factor to your participation in leisure-time physical activity:**

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree or Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The facilities are of poor quality</td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
</tr>
<tr>
<td>I do not like the activities offered</td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
</tr>
<tr>
<td>The facilities are inadequate</td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
</tr>
<tr>
<td>The facilities are crowded</td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
</tr>
<tr>
<td>Transportation to facilities takes too much time</td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
</tr>
<tr>
<td>I have no opportunities to exercise or do activities I want near my home</td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
<td><img src="Solid" alt="Solid" /></td>
</tr>
</tbody>
</table>
I cannot afford to use an exercise facility.
**22. Please evaluate the importance of each individual item as a constraining or limiting factor to your participation in leisure-time physical activity:**

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Agree</th>
<th>Neither Agree or Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not have time because of my work commitments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not have time because of my family commitments</td>
<td></td>
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</tr>
<tr>
<td>I do not have time because of my social commitments</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>The facility timetable does not fit with mine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to exercise or work out with</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
23. Please list any other factors that constrain or limit your participation in leisure-time physical activity:
14. Current Memberships

<table>
<thead>
<tr>
<th>23. Do you currently have a membership to UNC Campus Recreation Facilities and Services (including the Recreation Centers)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>24. Do you have membership with a private gym, YMCA or other Recreation facility?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
Active Employees!

15. Gym and Pool Privileges Drawing

A drawing for a one-year gym and pool privilege will take place following the completion of data collection.

The winner will be notified by December 1, 2005.

* 25. Do you wish to be included in the drawing for free gym and pool privileges for one year?

- Yes
- No

26. If yes, please provide your email address:

[Input field]

27. Contact telephone number:

[Input field]

<< Prev    Done >>
References


the Risk of Acute Myocardial Infarction in Men. *New England Journal of Medicine, 330*, 1549-1554


