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EXAMINING RECREATIONAL ACTIVITY AND SETTING CHARACTERISTICS

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EXAMINING RECREATIONAL ACTIVITY AND SETTING CHARACTERISTICS
AND THEIR INFLUENCE ON MENTAL RESTORATION

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Parks, Recreation, and Tourism Management

by
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Accepted by:
Dr. Robert Powell, Committee Chair
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ABSTRACT

The last 50 years have seen much research, theory development, and building of the concept of restorative environments and their associated effects on people's cognition, attention, and moods. However, much of this research has focused exclusively on setting characteristics and largely ignored the influence of activity on restorative outcomes. Thus, the purpose of this research was to explore the effects of semester-long recreational activity participation by comparing varying degrees of recreational activity and setting characteristics and their influence on mental restoration, general affective state, and perceived stress levels in college students that were enrolled in a range of multi-week physical recreation classes. Students participating in Leisure Skills classes, involving a range of recreational activities and settings, at Clemson University were surveyed during the 2007 spring semester. Male participants tended to report higher general affective states than females. While no significant differences in restorative outcomes were found in association with setting characteristics, higher projected academic performance was associated with those students assessing their recreational settings as completely built. In addition, increased immediate restorative measures were associated with higher perceived levels of autonomy and physical intensity. While demographic differences may explain some or all of the findings, variables concerning both the setting as well as the activity appeared important in predicting restorative outcomes. Future analyses of these data should examine whether differences due to gender, class level, or previous GPA can explain these relationships.

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Many thanks to those who challenged, supported, and saw something more in me.
Without their voices, I would not be where I am today.

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CHAPTER ONE

INTRODUCTION

The following research is based upon the broad foundation of mental fatigue and the ways in which it can be combated. An online medical dictionary defines mental fatigue as “fatigue arising in consequence of mental effort.” This type of condition can be likened to the end of a college semester brain cramp or the feeling one gets after they spend many hours devoted to a particular task required intense focus, such as writing a thesis.

Some of the first individuals to examine these conditions of the mind were Kaplan and Kaplan. Much of their work is based upon foundation laid by William James, a 19th century psychologist who proposed the ideas of putting forth effort with one’s attention and the opposite, involuntary attention (1892). Kaplan and Kaplan used James’ ideas as a foundation to develop the concept of directed attention fatigue (DAF), a condition in which one’s ability to focus the mind on a specific task is hindered and dulled (Kaplan & Kaplan, 1982, 1989). Kaplan and Kaplan further used this concept to come up the Attention Restoration Theory (ART) framework. This theoretical development states that the optimal recovery form DAF is in the outdoor, natural environment, which has certain qualities essential to restoration of the mind (Kaplan, S., 1995).

Supporting this theory is a host of studies (Berto, 2005; Grahn & Stigsdotter, 2003; Hartig, Mang, & Evans, 1991; Tennessen & Cimprich, 1995) that supports the idea that outdoor, natural settings foster restorative outcomes in terms of attention performance and positive affect. Outcomes such as improved ability to concentrate,

measures of attention, proofreading scores, and general positive affect are just a few of the restorative outcomes that have been shown to be related to exposure to outdoor, natural area. Interestingly, many of the restoration literature also utilizes recreational activities such as running (Bodin & Hartig, 2003), backpacking (Hartig, Mang, & Evans, 1991), and general leisure (Hull IV & Michael, 1995). The question then becomes: do the activities themselves perform any function in the restorative process? What role are the recreational and leisure activities playing in the outcomes?

According to exercise science and sport psychology literature, certain aspects of recreational activities can lead to restorative outcomes. Physically intense activities have been shown to bring about positive moods while reducing stress levels and depressive moods (Hansen, Stevens, & Coast, 2001; Rocheleau, Webster, Bryan, & Frazier, 2004). Other characteristics such as the physical challenge, autonomy, perceived competence, and risk in the activities have been shown to positively influence general affective outcomes as well (Jones, 2003; Mannell, Zuzanek, & Larson, 1988).

It is the combination of these two ideas, activity and setting, that is the focus of the following papers. The following research takes the form of two journal articles in which characteristics of the activity and the setting are analyzed with respect to restorative outcomes.

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CHAPTER TWO

EXAMINING RECREATIONAL ACTIVITY AND SETTING CHARACTERISTICS AND THEIR INFLUENCE ON MENTAL RESTORATION

Introduction

Millions of people are increasingly suffering from mental stress and fatigue, which has become epidemic in today's modern workplace (Cox, 2000; McVicar, 2003; Wooden, 2001). As early as 1865, Frederick Law Olmstead recognized that stress reduction and mental health could be enhanced through change and distraction from everyday routines and business (1865). Conversely, mental stress and fatigue are thought to increase and mental health to be compromised without opportunities for leisure and rest. According to Attention Restoration Theory (ART), one's directed attention, or one's ability to focus, can tire from overuse and over-stimulation, which results in stress that requires time away from the stimulus for rest and recovery (R. Kaplan, & Kaplan, S., 1989; S. Kaplan, 1995). Certain environments and activities that aid in this mental recovery are said to possess restorative qualities. They are described as being interesting in and of themselves, and can hold one's attention with little or no effort. In particular, the outdoor, natural environment is thought to be optimal for inducing mental restoration (R. Kaplan, & Kaplan, S., 1989; S. Kaplan, 1995). Many studies suggest that contact with outdoor, natural settings foster a restorative outcome in terms of attention performance and positive affect (Berto, 2005; Grahn, 2003; T. Hartig, Mang, M., & Evans, G. W., 1991; Taylor, 2001; Tennessen, 1995). In addition, research suggests that certain physical activities and exercise also produce positive moods and lower reported levels of stress (C.

J. Hansen, Stevens, L. C., & Coast, J. R., 2001; Hassmen, 2000; Lee, 2001; Ray, 2001; Rocheleau, 2004; Salmon, 2001).

However, despite the emerging research focusing on the influence of the natural environment or physical activities, investigating the connection between the two has been excluded from mental restoration research. Although investigations have utilized recreational and leisure activities in which to examine the effects of indoor versus outdoor environments (Bodin, 2003; T. Hartig, Mang, M., & Evans, G. W., 1991; Hull IV, 1995) no study has chosen to look at specific characteristics of an activity that might complement or dominate the restorative effects of setting. Prior studies that have sought to study the effects of particular physical activity characteristics have investigated constructs such as intensity, freedom of choice, perceived competence, challenge, skill, and risk (Hassmen, 2000; Jones, 2003; Mannell, 1988; Salmon, 2001). The aim of this study is to investigate the effects of both environment and activity to better understand mental restoration. Thus, the purpose of this research is to explore the effects of semester-long recreational participation by comparing recreational activity and setting characteristics and their influence on mental restoration, general affective state, and perceived stress levels in college students that were enrolled in a range of multi-week physical recreation classes.

Restoration and the natural environment

Rachel Kaplan and Stephen Kaplan developed the Attention Restoration Theory (ART) to explain both restorative outcomes and restorative environmental characteristics

(R. Kaplan, & Kaplan, S., 1989; S. Kaplan, 1995). A premise underlying this theory is that individuals are afforded a finite capacity for focusing on certain tasks or directing one's attention. Using the concept of fatigue as an antecedent, Kaplan and Kaplan (1989; S. Kaplan, & Kaplan, R., 1982) propose that recuperation from directed attention fatigue (DAF) is available when involuntary attention is engaged and directed attention is able to rest. In particular, ART hypothesizes that the optimal restorative experience occurs in the outdoor, natural setting (Herzog, 1997; R. Kaplan, Kaplan, S., & Ryan, R. L., 1998; S. Kaplan, 1993, 1995). This is an important distinction and a growing body of research has examined this relationship between environmental characteristics and quality of life, mental restoration, students' attention measures, health care and recovery, workplace satisfaction and productivity, domestic violence, and ecological values (Hartig, Kaiser, & Bowler, 2001; James, 1892; S. Kaplan, 1993; Kuo, 2001; Larsen, 1998; Ogunseitan, 2005; Tennessen, 1995; Ulrich, 1984). The results of these studies suggest that interacting with nature, from simply having a view of nature to direct physical exposure, can significantly improve one's mental state. Ulrich (1984) conducted a study among recovering surgery patients and found that hospital rooms with window views of natural elements, such as trees, grass, shrubs, etc., produced faster recovery times. The patients with a natural view were also reported to have a more positive outlook, required fewer pain medications, and had fewer post-surgical problems. This is not to say that nature supersedes medical procedures, but a window with a natural view appears to positively affect patient recovery and well-being while in a hospital environment.

More recently Ogunseitán (2005) found that people's perception of quality of life (QOL) was connected to the presence of restorative natural elements. Elements such as flowers, lakes, and oceans were viewed to be restorative and their presence predicted a higher QOL. Similarly, Kuo and Sullivan (2001) examined how views of natural elements appeared to have an effect on levels of domestic violence among inner-city residents. Apartment buildings that provided views of nature were labeled as "green buildings." Findings showed that residents of apartment buildings that provided views of nature reported lower levels of domestic aggression and violence than did residents of buildings without views of nature. The residents of these barren buildings were also shown to report higher levels of mental fatigue. From these findings, it could be argued that exposure to "unnatural environments" brings about mental fatigue that may lead to increased stress and irritability and to potentially higher levels of violence within the home.

Hartig, Kaiser and Bowler (2001), looking at the effects of restorative natural environments on ecological behavior, found that perceived restorative characteristics of environments led to increased environmental conservation attitudes. The environmental conservation attitudes reflected positive attitudes toward recycling and driving less. In this example, it appears that a restorative environment instills a sense of ownership within users in a positive environmental social exchange framework.

In an office setting, many methods are used to increase worker performance. Some individuals prefer an ergonomic chair while others may choose to listen to music while they work. Kaplan (1993) found that employees in offices that provided a view to

natural elements, such as trees, grass, and shrubs, reported fewer illnesses during the year as well as reported higher levels of job satisfaction. A second study further supported Kaplan's findings that natural views resulted in increased levels of enthusiasm for one's job and reduced levels of impatience and frustration in the workplace (1993). In similar studies, the mere presence of plants in the workplace was positively associated with self-reported increases in mood, perceived office attractiveness, and perceived comfort (Larsen, 1998). Similarly, in a study of college dorm residents, Tennessen and Cimprich (1995) found that students with natural views displayed higher abilities to focus and pay attention. These students also scored higher on self-report measures of directed attention.

From these, and many other studies dealing with natural elements and their effects on work performance, attention levels, and quality of life, the results strongly suggest that regular exposure to natural environments enhance mental restoration and reduced stress levels.

Setting or Experience?

Although these studies suggest that exposure to natural environments enhance mental restoration, other studies have begun to examine the influence of other factors (Bodin, 2003; Canin, 1991; Hull IV, 1995; Scopelliti, 2004). Some argue that restorative environments should be thought of holistically and as a global event in which place, individual, social setting, and activity interact to produce restorative benefits (Scopelliti, 2004). Studies that support the notion that restorative environments should be viewed from a holistic perspective include an examination of general recreational activities

occurring outdoors versus indoors (Hull IV, 1995), examining running in park settings versus urban settings (Bodin, 2003), and perception of restorative environments according to stages of the life-span (Scopelliti, 2004). Hull IV and Michael (1995) found that individuals recreating indoors and outdoors displayed similar restorative benefits such as reduced stress levels. Bodin and Hartig (2003) investigated the effects of setting on recreational runners in a park and urban setting. The running activity in both settings was found to significantly lower anxiety/depression and anger levels. These findings suggest that natural surroundings were no more restorative than urban settings although runners preferred the natural setting and perceived it more restorative than the urban route. Both of these studies, as well as many others (Heywood, 1978; Parker, 1976; Staines, 1980), lend validity to the notion that restorative environments should be viewed holistically. In particular, these studies suggest that regular participation in leisure activities relieve mental and physical tension and foster restorative benefits regardless of the setting in which they occur. But what is it about these activities that allow for this relief to occur?

Activity Characteristics

There are many investigations that examine activity levels and intensity in relation to affect and mood measures. Consistently, findings show that the intensity of physical activity has an effect on mood measures (C. J. Hansen, Stevens, L. C., & Coast, J. R., 2001; Rocheleau, 2004), stress measures (Hassmen, 2000; Salmon, 2001), and reduction of depressive moods (Lee, 2001; Ray, 2001). Other studies point to the idea

that there may be an ideal, not necessarily a maximum, amount of physical activity duration for restoration to occur. McNaughten and Gabbard (1993) found that 30 and 40 minute walks in the afternoons improved mental functioning significantly more than 20 minute walks. Since walking may be experienced as a lower physically intensive activity, longer duration may be needed. Similarly, research examining cycling showed that while all participants recorded reduced levels of anxiety, those who completed more intense cycling sessions were found to report significantly higher levels of anxiety than those who completed light cycling sessions (Ivancevich, Lorenzi, Skinner, & Crosby, 1997; Tieman, 2002). Finally, Mannell, Zuzanek, and Larson (1988), in a study of leisure choice, investigated individuals' freedom of choice. In most cases, higher levels of freedom of choice (autonomy) brought about higher levels of positive affect, concentration, and lower levels of tension. Therefore, duration, intensity, and autonomy related to a given physical activity are factors that appear to influence restorative and affective outcomes.

Individual Characteristics and Restorative Outcomes

According to research, preferred restorative environments vary depending upon personal characteristics. One environment may be restorative while another person may find the same place stressful, depending upon the person's individual characteristics (S. Kaplan, Bardwell & Slakter, 1993). However, when examining restorative outcomes, individual characteristics are rarely examined although gender, appears to have the most relevance in past research. In general, an activity-mood relationship is strongest in

females (Hansen, Moses, & Gardner, 1997) although previous research shows that females tend to report higher negative moods prior to engaging in physical activity, such as exercise (Merns, 1995), which might explain this stronger relationship. Males, however, show significantly higher levels of self-confidence in sport activity settings (Lenney, 1977; Lirgg, 1991). The position of these papers is that a restorative experience can occur through recreational activities and their associated settings. Recreational activities are comprised of setting and a variety of activity characteristics such as physical and mental demand, risk, and intensity. It is the goal of this paper to further examine the role of environmental, recreational, and participant characteristics, upon mental restoration, affect, and stress.

Study Setting

This study examined and compared varying degrees of recreational activities' characteristics, their associated settings, and the effect they have on restorative outcomes. The study was conducted at Clemson University with students enrolled in Leisure Skills classes. The Leisure Skills (LS) program offered 40 recreational activities in 121 different sections to a student body numbering approximately 17,500 during the spring of 2007. The LS classes are voluntarily selected to fulfill elective hour requirements. The activities included outdoor activities such as backpacking, mountain biking, whitewater kayaking, as well as indoor activities such as yoga, racquetball, and rock climbing on an artificial structure. Enrollment in each class varied between 10 and 30 individuals depending on the activity. Each class met either once or twice a week for 12 weeks for a

weekly class time of two hours and fifty minutes. One elective credit hour is earned for each class based on students' performance and attendance.

Methods

Sample and Procedures

Individual classes were selected based on instructor agreement to allow a survey to be administered to their class. Initial contact with each instructor was made by means of an e-mail explaining the purpose of the study and requesting voluntary participation. Of the 121 sections offered, instructors of 30 classes agreed to the researcher's request for participation. The 30 classes had an enrollment of 542 students. All students participating in the 30 classes were asked to complete a survey during the last week of classes and immediately after completion of the activity. Of the 542 participating students, 427 agreed to complete the questionnaire, yielding a response rate of 79%. The data collected and presented here represent a part of a larger study with the LS program. Not all items included in the larger analysis are included here.

Instrument Development

This study sought to investigate the influence of semester-long participation in a range of recreational activities occurring in a range of different settings. These two general variables, activity and setting are then analyzed to observe effects on mental restoration. In particular, the study investigated the role of gender, perceived autonomy, physical challenge of the activity, and setting characteristics on a range of affective restorative outcomes.

To that end this study used categorical questions to investigate perceived autonomy (2 independent items), physical challenge (2 items) and characteristics of the activity setting (1 item) (see TABLE 2.1) which were adapted from similar studies examining recreational activities (Jones, 2003; Mannell, 1988). All items were measured using a 5-point Likert-type scale.

Two independent items were used to assess perceived autonomy within the recreational activities. One question was worded in a positive statement(+), while the other was worded negatively(-) (see TABLE 2.1). Each of the items was analyzed separately because the alpha reliability for a composite index was too low ($\alpha=.279$).

Physical challenge of recreational activities was determined through a composite of two categorical questions ($\alpha=.827$) referring to the respondents' perceived physical challenge and perceived physical exertion required in the activity (see TABLE 2.1).

TABLE 2.1: Items regarding the recreational environment

Autonomy (treated as individual items)					
-I feel the activity provides me with choices and options.	1	2	3	4	5
-I feel hindered and limited by the rules and boundaries of the activity.	Strongly disagree				Strongly Agree
Physical Challenge Index $\alpha=.827$					
-How would you describe the level of physical exertion required in the activity?	1	2	3	4	5
-How would you describe the general level of physical challenge within the activity?	Very Low				Very High
Please describe the primary setting where this activity takes place.					
	1	2		3	
	Completely Built	Semi-built/Semi-natural		Completely Natural	

To explore the potential restorative outcomes induced by semester-long participation in recreational activities occurring in different settings, four affective outcome scales were used. In addition, due to the semester-long exposure to the recreational activity and recreational setting, the researchers investigated the immediate, mid-term, and long-term restorative outcomes by giving each scale a different response time frame. An immediate rejuvenation scale (IRS) ($\alpha = .854$) was developed which was comprised of four items concerning feelings of rejuvenation, energy level, capacity to concentrate, and overall mood. Items were measured using 5-point Likert-type scales (see TABLE 2.2). Participants were asked, “*The following questions refer to the feelings that the activity evokes in you IMMEDIATELY after this activity.*”

TABLE 2.2: items composing the immediate rejuvenation scale

<i>To what extent does this activity make you feel rejuvenated?</i>	1 <i>Not Rejuvenated</i>	2	3	4	5 <i>Very Rejuvenated</i>
<i>To what extent does this activity boost your general energy level?</i>	1 <i>Not at all</i>	2	3	4	5 <i>Very much</i>
<i>To what extent does this activity improve your ability to concentrate (i.e. study)?</i>	1 <i>Not at all</i>	2	3	4	5 <i>Very much</i>
<i>To what extent does this activity improve your overall mood?</i>	1 <i>Not at all</i>	2	3	4	5 <i>Very much</i>

The Effective Functioning Scale (EFS) (R. Kaplan, 2001) also was used to measure the influence of participation in the classes over the last few days. The EFS ($\alpha = .914$) is composed of 16 brief descriptors and 15 adjective items concerning general well being and feelings of being effective in daily routines. Items were measured using 5-point Likert type scales with response anchors of *not at all* to *very much*. Two additional scales

were included with a time frame of “during the PAST FEW WEEKS,” to examine longer lasting restorative outcomes as a result of participating in the recreational classes. A 4-item version of the Perceived Stress Scale ($\alpha = .701$) was used to explore general stress levels (Cohen, 1983). A stress component was included because of the importance of stress for predicting mental fatigue and restoration (Hartig, Kaiser, & Bowler, 2001) in the recreational environment (Norling, 2006). Finally, a global measure of affect, the Positive and Negative Affect Schedule (PANAS), was also included (Watson, 1988). This scale uses 20 positive and negative adjectives in which respondents indicate to what extent they experienced each descriptor. Items were measured using a 5-point Likert type scale with response categories of *very slightly or not at all*, *a little*, *moderately*, *quite a bit*, and *extremely*. The positive set ($\alpha = .860$) of descriptors are separated from the negative set ($\alpha = .788$) and used as independent scales when analyzed and reported.

To examine effects on academic performance, the survey included an item asking how students feel their present performance compares to previous semesters' performance. This last item had 5-point response categories of *Much worse*, *Worse*, *About the same*, *Better*, and *Much better*.

Results

Participants that chose to take the survey were current students at Clemson University during the 2007 spring semester. Of the students that took the survey, 54% were male, with a mean age of 20.77 years. Most participants identified themselves as white (86.2%) with 2.1 % not choosing to select any ethnic category. Class standing was

evenly distributed with approximately 20% freshman, 26 % sophomore, 19% junior, 29% senior, and 6% graduate level (TABLE 2.3).

TABLE 2.3: Demographic Characteristics of Participants

<i>Demographic Variable</i>	<i>Data</i>
Sex	
Male	227 (54%)
Female	193 (46%)
Age	
Mean \pm S.D.	20.77 \pm 3
(Min, Max)	(18, 58)
Year in school	
Freshman	85 (19.9%)
Sophomore	109 (25.5%)
Junior	79 (18.5%)
Senior	122 (28.6%)
Graduate Study	25 (5.9%)
GPA	3.19 (0.51)
Ethnicity	
White, not of Hispanic decent	368 (86.2%)
Black, not of Hispanic decent	24 (5.6%)
Hispanic	5 (1.2%)
Asian or Pacific Islander	12 (2.8%)
American Indian	2 (.5%)
Do not wish to answer	9 (2.1%)

Activity and setting characteristics results are presented in TABLE 2.4. The two independent autonomy items and the physical challenge index results were collapsed to form “low”, “medium”, and “high” categories to provide approximate normal distributions. Overall, the positively worded autonomy (+) item had a mean of 2.17 with 19.2% of respondents in the “low” response category (1-3 on Likert scale), 44.3% in the “medium” category (4 on Likert Scale), and 36.5% in the “high” autonomy category (5 on Likert Scale) for their respective activities. The negatively worded autonomy (-) item had

a mean of 1.47 with 11.5% of respondents in the “low” response category (3-5 on Likert scale), 24.1% in the “medium”category (2 on Likert Scale), and 64.4% in the “high” autonomy category (1 on Likert Scale) for their respective activities.

TABLE 2.4: General results for activity and setting characteristics

<i>Variable</i>	<i>Data (%)</i>
Autonomy(+)	M = 2.17
Low	19.2
Medium	44.3
High	36.5
Autonomy(-)	M = 1.47
Low	11.5
Medium	24.1
High	64.4
Physical challenge index	M = 3.32
Low	26.7
Medium	36.8
High	36.5
Physical setting	
Completely built	34.0
Semi-built/semi-natural	44.1
Completely natural	21.9

Physical challenge had a mean of 3.32 with 26.7% indicating a low level of physical challenge, 36.8% indicating a mid-level of challenge, while 36.5% indicated a high level. Finally, 34% of respondents described the setting as completely built, 44% described the setting as semi-built/semi-natural, and 22% indicated the setting as completely natural.

General results from the four affective scales show the immediate rejuvenation scale with a mean score of 15.34, Effective Functioning Scale (EFS) with a mean of

109.64, the Perceived Stress Scale with a mean of 10.21, Positive Affect with a mean of 35.44, and Negative Affect with a mean of 19.40 (see TABLE 2.5).

TABLE 2.5: Overall means for dependent measures

<i>Dependent Scale</i>	<i>Mean (Min, Max)</i>
Immediate Rejuvenation Scale (IRS)	15.34 (4, 20)
Effective Functioning Scale (EFS)	109.64 (54, 147)
Perceived Stress Scale (PSS)	10.21 (4, 18)
Positive and Negative Affect Scale (PANAS)	
Positive Affect (PA)	35.44 (17, 50)
Negative Affect (NA)	19.39 (10, 44)

Comparison of Gender, Setting Characteristics, Autonomy, and Physical Intensity on Restoration Outcomes

The intent of this research was to explore the effects of semester-long participation in recreational activities on one’s mental restoration, general affective state, and perceived stress levels and to compare the influence of certain recreational environmental characteristics. To achieve this goal, the researchers compared gender, setting, autonomy level, and physical intensity level on the restorative outcome measures and school performance through a series of analysis of variance (ANOVA) tests.

Gender

Males self-reported significantly higher scores with respect to feelings of effective functioning and general positive affect and significantly lower levels of perceived stress and general negative affect, as compared to females (TABLE 2.6). Non-significant

differences between males and females were found in the immediate rejuvenation scale and projected academic performance.

TABLE 2.6: T-test comparing gender and affective measures

Variable	Male		Female		df	t
	M	SD	M	SD		
Rejuvenation	15.33	2.77	15.35	3.45	415	-0.07
Effective Functioning	111.96	15.50	106.88	17.34	374	3.00**
Perceived Stress	9.87	2.55	10.65	2.66	417	-3.05**
Positive Affect	36.49	5.91	34.25	6.54	407	3.65***
Negative Affect	18.38	6.05	20.37	6.87	408	-3.11**
Projected performance	3.36	0.84	3.22	0.98	416	1.59

Recreational Setting

Participants categorized the setting in which their recreational activity took place: *completely built*, *semi-built/semi-natural*, or *completely natural*. Of the 424 respondents to this item, 144 (34%) described their setting as completely built, 187 (44.1%) as semi-built/semi-natural, and 93 (21.9%) as completely natural. When comparing the setting types, students' scores on the immediate rejuvenation scale, effective functioning, perceived stress, or the PANAS scale were not significantly different. However when comparing setting types, students' perception of academic performance in the current semester as compared to previous semesters was significantly different. Those participating in an activity in a completely natural setting projected significantly lower ($p < .05$) (see TABLE 2.7) academic performance, than those participating in a recreational activity in a completely built setting. In general, everyone was expecting better

performance in the current semester than usual, but the participants in the completely built settings were more optimistic than folks in completely natural settings.

TABLE 2.7: ANOVA comparing self-described setting type and affective measures

Variable	<u>Completely Built</u>		<u>Semi-built/ Semi-natural</u>		<u>Completely Natural</u>		F	p
	M	SD	M	SD	M	SD		
Rejuvenation	15.19	3.30	15.26	2.92	15.85	2.79	1.502	0.224
Effective Functioning	110.28	16.24	108.57	17.45	110.51	14.67	0.573	0.564
Perceived Stress	10.14	2.64	10.29	2.57	10.28	2.63	0.155	0.856
Positive Affect	35.39	5.97	34.96	6.51	36.23	6.16	1.251	0.287
Negative Affect	20.01	6.46	18.88	6.48	19.64	6.84	1.241	0.290
Projected performance	3.41 ^a	0.87	3.30	0.85	3.11 ^b	1.04	3.151	0.044

Note: a & b show significant differences at $p < .05$ using Bonferroni's post hoc test of significance

Perceived Autonomy

Two independent items were used to assess perceived autonomy within the recreational activities. One question was worded in a positive statement(+), while the other was worded negatively(-) (see TABLE 2.1). Each of the items was analyzed separately because the alpha reliability for a composite index was too low ($\alpha=.279$).

For the positively worded autonomy(+) item, posthoc-scores of 1, 2, and 3 were collapsed to form the low level of autonomy group. Scores of 4 were categorized as “medium” perceived autonomy and scores of 5 were categorized as “high” perceived autonomy. Of the 427 respondents, 19.2% were in the low perceived autonomy group,

44.3% in the medium autonomy group and 36.5% in the high autonomy group. An ANOVA and subsequent post hoc analysis comparison of the three groups revealed many significant differences (see TABLE 2.8). For this measure of autonomy(+) feelings of immediate rejuvenation differed among the groups. IRS significantly increased ($p < .05$) as perceived autonomy increased. Additionally, the low autonomy group was significantly lower ($p < .001$) in immediate rejuvenation than the high autonomy group. For this measure of autonomy(+), effective functioning differed significantly ($p < .05$) among the low and high autonomy groups with higher feelings of effective functioning accompanying higher levels of perceived autonomy. No differences can be seen among perceived stress, positive affect, negative affect, or projected academic performance.

TABLE 2.8: ANOVA comparing perceived autonomy(+) with affective measures

Variable	Low		Medium		High		F	p
	M	SD	M	SD	M	SD		
Rejuvenation	14.01 ^a	3.19	15.22 ^b	3.01	16.19 ^c	2.83	14.510	0.000
Effective Functioning	106.25 ^a	17.33	108.61	15.38	112.74 ^b	17.02	4.380	0.013
Perceived Stress	10.23	2.64	10.42	2.55	9.95	2.70	1.392	0.250
Positive Affect	34.70	6.04	35.05	5.89	36.29	6.83	2.272	0.104
Negative Affect	20.03	7.54	19.73	6.41	18.65	6.15	1.584	0.206
Projected performance	3.26	0.75	3.22	0.93	3.41	0.94	1.854	0.158

Note: a, b & c show significant differences at $p < .05$, using Bonferroni's post hoc test of significance

Note: Low and High Rejuvenation groups differ at $p < .001$

For the negatively worded autonomy(-) item, posthoc-scores of 3, 4, and 5 were collapsed to form the low level of autonomy group. Scores of 2 were categorized as “medium” perceived autonomy and scores of 1 were categorized as “high” perceived autonomy. Of the 427 respondents, 11.5% were in the low perceived autonomy group, 24.1% in the medium autonomy group and 64.4% in the high autonomy group. An ANOVA and subsequent post hoc analysis comparison of the three groups revealed many significant differences (see TABLE 2.9).

TABLE 2.9: ANOVA comparing perceived autonomy(-) with affective measures

Variable	Low		Medium		High		F	p
	M	SD	M	SD	M	SD		
Rejuvenation	14.49 ^a	3.61	14.74 ^a	2.84	15.73 ^b	3.00	6.130	0.002
Effective Functioning	104.07 ^a	15.74	106.46 ^a	15.15	111.84 ^b	16.75	6.603	0.002
Perceived Stress	11.14 ^a	2.50	10.46	2.56	9.96 ^b	2.63	4.913	0.008
Positive Affect	33.35 ^a	6.60	34.93	5.39	35.99 ^b	6.48	3.952	0.020
Negative Affect	21.89 ^a	7.72	20.51 ^a	6.16	18.53 ^b	6.33	7.326	0.001
Projected performance	3.06	0.85	3.28	0.90	3.35	0.91	2.110	0.123

Note: a & b show significant differences at $p < .05$, using Bonferroni's post hoc test of significance

For this measure of autonomy(-) feelings of immediate rejuvenation differed among the groups. IRS significantly increased ($p < .05$) as perceived autonomy increased. The high autonomy(-) group reported significantly higher rejuvenation ($p < .05$) than the low and medium groups. For this measure of autonomy(-) feelings of effective functioning differed among the groups. EFS significantly increased ($p < .05$) as perceived autonomy increased. The high autonomy(-) group reported significantly higher effective

functioning ($p < .05$) than the low and medium groups. For this measure of autonomy(-), perceived stress differed significantly ($p < .05$) among the low and high autonomy groups with higher feelings of stress accompanying lower levels of perceived autonomy. Positive affect differed significantly ($p < .05$) among the low and high autonomy groups with higher feelings of positive affect accompanying higher levels of perceived autonomy. Feelings of negative affect differed among the groups. NA significantly increased ($p < .05$) as perceived autonomy decreased. The high autonomy(-) group reported significantly lower levels of NA ($p < .05$) than the low and medium groups. Finally, no significance was found between groups regarding projected academic performance.

Physical Challenge

Physical challenge of recreational activities was determined through a composite of two categorical questions ($\alpha = .827$) referring to the respondents' perceived physical challenge and perceived physical exertion required in the activity. Physical challenge produced significantly different ($p < .05$) scores only in feelings of immediate rejuvenation (IRS) (Table 2.10).

Those that rated the activity as *low* in physical challenge scored significantly lower on feelings of rejuvenation than did those who rated physical challenge as *medium* and *high*. Additionally, there were significant differences at the $p < .001$ level in feelings of immediate rejuvenation between those that rated activities *low* in physical challenge and those that rated the activity *high* in physical challenge. Those respondents rating their activities as *high* in physical challenge showed significantly higher feelings of immediate rejuvenation. Finally, when comparing physical challenge levels of the activities and

students' scores on longer term restorative outcomes such as effective functioning, perceived stress levels, positive and negative affect (PANAS), and projected academic performance, no significant differences were found.

TABLE 2.10: ANOVA comparing perceived physical challenge with affective measures

Variable	<u>Low</u>		<u>Medium</u>		<u>High</u>		F	p
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Rejuvenation	14.34 ^a	3.28	15.27 ^b	3.02	16.15 ^c	2.76	12.005	0.000
Effective Functioning	112.07	16.25	109.40	16.31	108.13	16.78	1.702	0.184
Perceived Stress	9.85	2.76	10.30	2.62	10.38	2.52	1.510	0.222
Positive Affect	35.66	6.39	35.34	6.08	35.38	6.48	0.090	0.914
Negative Affect	18.72	6.62	19.39	6.34	19.86	6.72	0.950	0.388
Projected performance	3.34	0.87	3.25	0.91	3.31	0.93	0.298	0.743

Note: a, b & c show significant differences at $p < .05$ using Bonferroni's post hoc test of significance

Note: a and c differ from each other at the $p < .001$

Discussion

The intent of this research was to explore the effects of semester-long participation in recreational activities on one's mental restoration, general affective state, and perceived stress levels and to compare the influence of certain recreational and environmental characteristics on these outcomes. To achieve this goal, the researchers compared gender, setting, autonomy level, and physical intensity level on the restorative outcome measures and school performance through a series of analysis of variance (ANOVA) tests. Results suggest that gender may influence the restorative outcomes of

recreational activities and settings. Males' self-reported higher scores for effective functioning and positive affect while reporting significantly lower scores of perceived stress and negative affect (see TABLE 2.6). These findings support earlier research that suggests that females tend to exhibit more depressive symptoms and feelings of low self-efficacy (Nolen-Hoeksema, 1999) as well as reporting more negative moods before physical activities, such as exercise (Merns, 1995). The results may also be influenced by the fact that males expressed greater perceived skill and lower levels of physical intensity and physical challenge, which may be in part due to the general trend for males to exhibit higher levels of self-confidence in sport settings (Lenney, 1977; Lirgg, 1991). It may also be that gender has no direct influence on restorative outcomes, but that men and women self-select into recreational activities with different restorative outcomes.

Projected academic performance was negatively related to the presence of natural elements in the recreational setting. According to Tennessen & Cimprich (1995) college students' dorm windows with more natural featured views were associated with greater ability to concentrate and study. In contrast, the present study found that recreating in completely built settings reported better overall projected academic performance as compared to previous semesters. Although natural elements may foster a greater ability to concentrate, it may not completely translate to improved academic performance.

Alternatively, recreational activities occurring in natural settings may attract students with lower GPAs, or attract students during semesters in which they have lower academic aspirations (e.g., graduating seniors in their last semester of college). It should be noted that the Tennessen and Cimprich study involved quasi-random assignment of students to

condition, whereas in this study, students were able to self-select into different settings. Future analyses of these data should examine whether participant characteristics such as previous GPA, gender, and class-standing can explain the relationship found here.

Regarding the affective outcomes, the absence of significant differences when comparing setting types may be surprising to some restoration theorists. It might help to note that these outcomes are an indirect and suggestive case for more specific mental restoration. The absence of significance here does not in any way try to discredit the validity of previous research; it seeks only to add a wider view to the potential variables involved. This research does raise the question of whether the activity characteristics of recreation contribute more to restorative outcome measures possibly more than the recreation setting. Future analyses of these data should examine whether activity characteristics were confounded with setting, and should control for demographic differences in examining the relationships between setting and restorative outcomes.

For the positively worded autonomy item, higher perceived autonomy was accompanied with significantly higher scores for rejuvenation (immediate measure) and effective functioning (mid-term) than recreational activities with lower perceived autonomy. Similarly, for the negatively worded autonomy item, higher perceived autonomy was associated with significantly higher feelings of immediate rejuvenation, effective functioning, positive affect and significantly lower feelings of perceived stress and negative affect. Since this survey was administered near the end of the semester, it could suggest internalization of the potential benefits gained in this recreational environment but only in short-term outcomes. Typically as time passes, participants

become more independent within a recreational activity and experience more autonomy as competence and skills improve. For this particular sample of university students, autonomy appears to be an important factor associated with restorative outcomes. Further research is necessary to develop a better measure of autonomy in recreational activities and exploring the temporal aspect of restorative outcomes.

Physical challenge of the recreational activity appeared to significantly influence ($p < .05$) only the immediate rejuvenation scale. In this regard, those that rated the physical challenge of the activity as *medium* or *high* had significantly higher self-reports of rejuvenation (e.g. feeling rejuvenated, boosts in energy, concentration, mood). These findings do lend credit to previous research associating intensity of physical activities and affect (C. J. Hansen, Stevens, L. C., & Coast, J. R., 2001; Hassmen, 2000; Lee, 2001; Ray, 2001; Rocheleau, 2004; Salmon, 2001). It also aligns with McNaughten and Gabbard's (1993) findings that mental functioning improves significantly with a related measure of increased physical intensity. The results also suggest that while higher levels of physical challenge produced an increased immediate restorative benefit, in the longer term affective outcomes seem to remain constant, despite varying levels of physical challenge.

Conclusions

The results of this study have many implications for practitioners. In terms of gender specific recreational programs, recreational organizations concerned with improving female participation may see the findings as encouraging and useful. Similar

to previous research concerning female participation prior to recreational activities, this research suggests that post-activity negative affect and stress levels are significantly higher than males. Programmers interested in creating gender specific activities can use this data as a springboard for creating plans for increasing positive affect and reducing stress for participants in particular activities while maintaining focus on specific user groups.

In terms of choosing where programs are to be held, the results concerning the recreational setting appear to be inconclusive and suggest that further research is necessary to examine the interaction of activity and setting on restorative outcomes. In this study, students who selected recreational activities in natural settings were less optimistic in their projected academic performance than students selecting activities in built settings; however this finding runs counter to considerable previous research showing that spending time in natural environments enhances performance. It may be that the link between recreation in nature and projected academic performance found here reflects self-selection of less academically oriented students into more natural settings. What impact setting had on projected academic performance is an implied relationship and there are many intervening factors that may have influenced the outcomes

Higher feelings of autonomy within a given recreational activity were related to stronger immediate feelings of rejuvenation, effectiveness, positive affect and lower feelings of perceived stress and negative affect. Therefore, creating supportive social environments that foster recreational autonomy might be a worthwhile undertaking when programming for restorative outcomes.

Similarly, more physically challenging activities are associated with a significant increase in rejuvenation, but only in the short-term in this study. This consistent immediate result that more physically challenging recreational activities may produce increased immediate restorative benefits suggests that practitioners might consider designing programs that promote increased levels of physical challenge within any activity to enhance immediate restorative outcomes.

Taking all of these findings together, park and recreation agencies can begin to design programs meeting specific needs of the public. Creating more tailored, designed programs that meet specific concerns can be a great strength to any park and recreation department by allowing it to customize programs to deliver important restorative benefits.

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CHAPTER THREE

RELATED INFLUENCE OF ACTIVITY AND SETTING CHARACTERISTICS ON MENTAL RESTORATION

Introduction

The World Health Organization defines mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (“Mental health: Strengthening mental health promotion”, 2001) Today millions of people increasingly suffer from mental stress and fatigue, which has become epidemic in today’s modern workplace (Cox, 2000; McVicar, 2003; Wooden, 2001). As early as 1865, Frederick Law Olmstead recognized that stress reduction and mental health could be enhanced through recreation in natural environments (1865). Conversely, mental stress and fatigue are thought to increase without opportunities for leisure and rest. According to Attention Restoration Theory (ART), one’s directed attention, or one’s ability to focus, can tire from overuse and over-stimulation, which results in stress that requires time away from the stimulus for recovery (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995). Certain environments and activities that aid in this mental recovery are said to possess restorative qualities. They are described as being interesting in and of themselves, and can hold one’s attention with little or no effort. In particular, the outdoor, natural environment is thought to be optimal for bringing about mental restoration (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995). Many studies suggest that contact with outdoor, natural settings foster a restorative outcome in terms of attention performance

and positive affect (Berto, 2005; Grahn, 2003; T. Hartig, Mang, M., & Evans, G. W., 1991; Taylor, 2001; Tennessen, 1995). In addition, research suggests that certain physical activities and exercise also produce positive moods and lower reported levels of stress (Hansen, 2001; Hassmen, 2000; Lee, 2001; Ray, 2001; Rocheleau, 2004; Salmon, 2001).

However, despite the emerging research focusing on the influence of the natural environment or physical activities, investigating the connection between the two has been excluded from mental restoration research. Although investigations have utilized recreational and leisure activities in which to examine the effects of indoor versus outdoor environments (Bodin, 2003; T. Hartig, Mang, M., & Evans, G. W., 1991; Hull IV, 1995) no study has chosen to look at specific activity characteristics that might compliment or dominate the restorative effects of setting. The aim of this study is to investigate the effects of both environmental and activity characteristics to better understand mental restoration. Thus, the purpose of this research is to explore the relationships between the recreational activity and setting characteristics and their influence on mental restoration, general affective state, and perceived stress levels in college students that were enrolled in a range of semester-long physical recreation classes.

Attention Restoration Theory

While environmental psychology research suggests that engaging the natural environment produces a range of positive outcomes, understanding exactly what in the environment is responsible for the associated effects is complex and difficult to measure.

Rachel and Stephen Kaplan have sought to identify these important environmental features by establishing a theoretical basis for mental restoration with Attention Restoration Theory (ART) (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995). A premise underlying this theory is that individuals are afforded a finite capacity for focusing on certain tasks or directing one's attention. Using the concept of fatigue as an antecedent, Kaplan and Kaplan (1982; 1989) propose that recuperation from directed attention fatigue (DAF) is available when involuntary attention can take over and directed attention is able rest. In particular, ART states that environments that are conducive to involuntary attention, referred to as restorative environments are endowed with four central characteristics: being away, extent, fascination, and compatibility (R. Kaplan, Kaplan, & Ryan, 1998). Kaplan (1995) explains that the optimal restorative experience occurs in an outdoor, natural setting, which possesses liberal quantities of the four central characteristics. "Being away" refers to separating one's self from the source of fatigue and is a consistent theme within the restorative experience. "Being away" can be further subdivided into place, task, and mindset separations. Place involves physically removing one's self from the distraction. It could mean retreating to a nearby park to walk your dog or reclining in one's living room. Separation from tasks refers to putting aside elements of the job or work one is performing. Any element that could remind one of their work is kept to a minimum. A mindset separation involves reducing mental exertions to the lowest amounts possible. In sum, a disconnection with the source of fatigue is needed.

The element of "extent" refers to the depth of a place. Kaplan, Kaplan and Ryan (1998) describe a restorative environment as constituting "a 'world' of its own." This

implies that there needs to be elements in the environment that make it rich with variety while at the same time being ordered in a way that allows the individual to understand and make sense of the setting. A variety of textures and components implies the potential for discovery and an environment with extent invites exploration.

Drawing on different forms of attention proposed by William James (1892) Kaplan (1995) refers to involuntary attention, or attention that requires minimal effort as “fascination.” Recall that when involuntary attention, or fascination, is employed, directed attention is allowed to rest and recover. Fascination is the source of interest in a given situation and can be defined in two senses, hard and soft. More narrowly defined, hard fascination can be characterized as experiences that promote and even force one to forget the particular distraction or task and allow directed attention to be at rest. These “noisy” experiences may occur at a spectator sporting event or even participating in an active recreational event (R. Kaplan, Kaplan, & Ryan, 1998). Soft fascination, on the other hand, is characterized by the quality and ability to create a setting for “reflection” (Herzog, 1997; Herzong, 1997). Reflection can be defined as thinking about life’s larger problems, contemplating life goals, and envisioning one’s self in the bigger picture of things. An accepted arena for this reflection to occur is among the aesthetic qualities of nature (S. Kaplan, 1993). Soft fascination can be achieved in forms of activity such as “gardening and fishing [as they are] mind filling” (R. Kaplan, Kaplan, & Ryan, 1998). The setting itself can also create soft fascination through the behavior of animals, streams of water, or the color of the season. Ultimately, scenes with soft fascination allow for both restoration and reflection.

Finally, “compatibility” is needed between what the environment can offer and what the visitor desires. When these two items align, a restorative experience is possible. In the absence of compatibility, restoration can be severely hindered. In a museum or natural park, for example, a visitor that finds unexpected or unappealing aesthetics or attractions is likely to experience frustration and become even more fatigued (S. Kaplan, Bardwell, L. V., & Slakter, D. B., 1993). Thus, compatibility is needed for restoration to occur.

According to ART, a delicate balance exists between these four elements that promote restoration. Restoration is ultimately dependent upon a person’s individual characteristics and preferences, as one place may be restorative while another person may find the same place very stressful.

Restorative Experiences

Currently restoration research primarily focuses on setting characteristics; however, researchers are beginning to suggest that one must broaden their view of restorative environments and incorporate an ecological perspective, believing that there is an interrelationship between the setting and a person’s actions. This view is reinforced by the work accomplished by Roger Barker and Herbert Wright which ushered in the field of ecological psychology. This perspective accepts that humankind is an inherent part of any one environment (Proshansky, 1970). Some argue that restorative environments should be thought of holistically and as a global event in which place, individual, social setting, and activity interact to produce restorative benefits (Scopelliti, 2004). Studies that

support the notion that restorative environments should be viewed from a holistic perspective include an examination of general recreational activities occurring outdoors versus indoors (Walker, Hull IV, & Roggenbuck, 1998), running in park settings versus urban settings (Bodin, 2003), and perception of restorative environments according to stages of the life-span (Scopelliti, 2004). This study seeks to advance this line of research and thus will investigate mentally restorative experiences from a holistic perspective to include not only environmental characteristics but also activity and individual characteristics.

Activity Characteristics

There are many investigations that examine recreational activity characteristics and their influence on restorative and affective outcomes. In particular, research has focused on the levels and intensity of activities in relation to affect and mood measures. Consistently, findings show a positive relationship between the intensity of physical activity and increases in positive mood measures (Hansen, 2001; Rocheleau, 2004), resilience to and reduction of stress (Hassmen, 2000; Salmon, 2001), and reduction of depressive moods (Lee, 2001; Ray, 2001). Similarly, perceived difficulty, risk, competence, and autonomy within a physical activity, have also been shown to positively influence affective outcomes (Jones, 2003; Mannell, Zuzanek, & Larson, 1988). By combining these items in one study, this research builds on both the restoration literature (setting characteristics) and the recreational studies literature, particularly those involving activity characteristics leading to affective outcomes. The study chooses to supplement

restorative environment's research by incorporating the component of people's actions within the setting, in this case, recreational activities.

Methods

Sample and Procedures

The study objectives were to investigate the influence of semester-long participation in a range of recreational activities occurring in a range of environments on mental restoration. In particular, the study investigated the role of perceived challenge, autonomy, physical intensity, and setting characteristics on a range of affective restoration outcomes and academic performance. This study was conducted by means of a survey of students participating in Leisure Skills (LS) classes at Clemson University during final weeks of the 2007 spring semester. The Leisure Skills (LS) program offered 40 recreational activities in 121 different sections to a student body numbering approximately 17,500 during the spring of 2007. The LS classes are voluntarily selected to fulfill elective hour requirements. The activities included outdoor activities such as backpacking, mountain biking, whitewater kayaking, as well as indoor activities such as yoga, racquetball, and rock climbing on an artificial structure. Classes were selected based on instructor approval. Initial contact to each instructor was made by means of an e-mail explaining the purpose of the study and requesting voluntary participation. Of the 121 classes offered, instructors of 30 classes agreed to the researcher's request for participation. The 30 classes had a total enrollment of 542 students. Of the 542 participating students, 427 agreed to complete the questionnaire, yielding a response rate

of 79%. The data collected and presented here represent a part of a larger study with the LS program. Not all items included in the larger analysis are included here.

Independent Variables

In an effort to investigate the influence of activity characteristics, a range of self-report items were adapted from various studies that examined autonomy, perceived competence, perceived challenge, skill, and risk in various recreational activities (Jones, 2003; Mannell, Zuzanek, & Larson, 1988). Additionally, measures perceived mental challenge and items concerning instructor effectiveness were developed to better understand the varying characteristics of the different recreational activities (see TABLE 3.1). Two independent items were used to assess perceived autonomy within the recreational activities. One question was worded in a positive statement(+), while the other was worded negatively(-). Each of the items was analyzed separately because the alpha reliability for a composite index was too low ($\alpha=.279$) (see TABLE 3.1). One item was used to assess one's perceived competence within the activity as well as an item to assess one's perceived skill. Although thought to be similar constructs, in this study competence and skill were deemed independent based on correlation and reliability analysis ($\alpha=.623$). A two item composite scale was used to assess *physical challenge* ($\alpha=.827$) and two additional independent items were included to assess one's mental challenge and perceived risk in the activity. Instructor effectiveness was measured using a 3 item composite scale ($\alpha=.877$). Finally, all activity characteristics items were measured with five-point Likert-type scales.

TABLE 3.1: Independent variables used in stepwise multiple regression

<i>Independent Variables</i>	Means (S.D.)
<i>Autonomy</i> (treated as independent items)	
(+) I feel that the activity provides me with choices and options on how to participate in the activity.	4.10 (0.88)
(-) I feel hindered and limited by the rules and boundaries of the activity ¹ .	4.48 (0.83)
<i>Competence</i>	
What is your general level of competence (having the knowledge needed to adequately participate) in the activity?	3.89 (0.92)
<i>Skill</i>	
What is your general skill level within this activity?	3.14 (0.98)
<i>Physical Challenge Index</i> $\alpha=.827$	
How would you describe the level of physical exertion required in the activity?	2.10 (0.79)
How would you describe the general level of physical challenge within the activity?	
<i>Mental Challenge</i>	
How would you describe the general level of mental challenge within the activity?	2.97 (1.06)
<i>Risk</i>	
How would you describe the level of physical risk within the activity?	2.58 (1.06)
<i>Instructor Index</i> $\alpha=.877$	
How effective is your instructor in teaching the activity?	13.39 (2.08)
How effective is your instructor in motivating you?	
How effective is your instructor in helping you develop skills needed to participate in the activity?	
<i>Perceived Restorativeness</i> ²	
Being Away (2 items) $\alpha=.793$	10.75 (2.47)
Fascination (5 items) $\alpha=.900$	19.20 (7.80)
Coherence (4items) $\alpha=.752$	7.17 (3.60)
Compatibility (5 items) $\alpha=.859$	24.32 (6.32)

¹ Coding is reversed for this item

² PRS components are a summed score with items rated 0=*not at all* to 6=*completely*

To assess the restorative characteristics of the settings, Hartig's (1996) 16-item version of the Perceived Restorativeness Scale (PRS) was used. Responses were measured using a seven-point Likert-type scale with answer categories anchored with *not at all* and *completely*. The PRS appraises the degree to which respondents perceive the elements of *being away*, *fascination*, *compatibility*, and *coherence* of the setting in

question. These four constructs, which were treated as independent scales, align with the theoretical framework proposed by the Kaplan’s Attention Restoration Theory (R. Kaplan & Kaplan, 1989; S. Kaplan, 1995).

Dependent Variables

To explore restorative outcomes, four affective scales were used. In addition, each scale was given a different response time frame to investigate the influence of participation in the recreational activity on immediate and more long-term restoration outcomes. An immediate rejuvenation scale (IRS) ($\alpha = .854$) was developed which was comprised of four items concerning feelings of rejuvenation, energy level, capacity to concentrate, and overall mood (TABLE 3.2). Items were measured using five-point Likert-type scales. Participants were asked, “*The following questions refer to the feelings that the activity evokes in you IMMEDIATELY after this activity.*”

TABLE 3.2: Items composing the immediate rejuvenation scale

<i>To what extent does this activity make you feel rejuvenated?</i>	1 Not Rejuvenated	2	3	4	5 Very Rejuvenated
<i>To what extent does this activity boost your general energy level?</i>	1 Not at all	2	3	4	5 Very much
<i>To what extent does this activity improve your ability to concentrate (i.e. study)?</i>	1 Not at all	2	3	4	5 Very much
<i>To what extent does this activity improve your overall mood?</i>	1 Not at all	2	3	4	5 Very much

The Effective Functioning Scale (EFS) (R. Kaplan, 2001) was also used to measure the influence of participation in the classes over “*the last few days*”. The EFS ($\alpha = .914$) is composed of 16 brief descriptors and 15 adjective items concerning general

well being and feelings of being effective in daily routines. Items were measured using five-point Likert-type scales with response anchors of *not at all* to *very much*. Two additional scales were included with a response time frame of “*during the past few weeks*,” to examine longer lasting restorative outcomes. A four-item version of the Perceived Stress Scale (PSS) ($\alpha = .701$) was used to explore general stress levels (Cohen, 1983). A stress component was included because of the importance of stress for predicting mental fatigue and restoration (Hartig, Kaiser, & Bowler, 2001) in the recreational environment (Norling, 2006). Finally, a global measure of affect, the Positive and Negative Affect Schedule (PANAS), was also included (Watson, 1988). This scale uses 20 positive and negative adjectives in which respondents indicate to what extent they experienced each descriptor. Items were measured using a five-point Likert-type scale with response categories of *very slightly or not at all*, *a little*, *moderately*, *quite a bit*, and *extremely*. The positive set ($\alpha = .860$) of descriptors are separated from the negative set ($\alpha = .788$) and used as independent scales when analyzed and reported.

TABLE 3.3: Scale reliability coefficients

<i>Scale</i>	<i>Alpha</i>
Immediate Rejuvenation Scale (IRS)	.854
Effective Functioning Scale (EFS)	.914
Perceived Stress Scale (PSS)	.701
Positive and Negative Affect Schedule (PANAS)	
Positive Affect (PA)	.860
Negative Affect (NA)	.788

Results

Participant Characteristics

Participants that chose to take the survey were students at Clemson University during the 2007 spring semester (TABLE 3.4). Of the students that responded, 54% were male, with a mean age of 20.77 years. Most participants identified themselves as white (86.2%) with 2.1 % not choosing to select any ethnic category. Class standing was evenly distributed with approximately 20% freshman, 26 % sophomore, 19% junior, 29% senior, and 6% graduate level.

TABLE 3.4: Demographic Characteristics of Participants

<i>Demographic Variable</i>	<i>Data</i>
Sex	
Male	227 (53.2%)
Female	193 (45.2%)
Age	
Mean \pm S.D. (Min, Max)	20.77 \pm 3 (18,58)
Year in school	
Freshman	85 (19.9%)
Sophomore	109 (25.5%)
Junior	79 (18.5%)
Senior	122 (28.6%)
Graduate Study	25 (5.9%)
GPA	3.19 (0.51)
Ethnicity	
White, not of Hispanic decent	368 (86.2%)
Black, not of Hispanic decent	24 (5.6%)
Hispanic	5 (1.2%)
Asian or Pacific Islander	12 (2.8%)
American Indian	2 (.5%)
Do not wish to answer	9 (2.1%)

Influence of Activity and Setting Characteristics on Restorative Outcomes

To explore whether activity and/or setting characteristics influenced the restorative outcomes induced from participation in a range of semester long recreational classes that occurred in a range of environmental settings, a series of five iterative stepwise multiple regression analyses were performed to develop the most predictive models using stepwise elimination with an alpha level of .05. Stepwise multiple regression analysis was performed for each dependent variable: *immediate rejuvenation scale (IRS)*, *Effective Functioning Scale (EFS)*, *Perceived Stress Scale (PSS)*, *positive affect*, and *negative affect (PANAS)*. Independent variables that were used in the regression were two measures for autonomy, one item for competence, one item for skill, a two item composite scale for physical challenge, one item for mental challenge, one item for perceived physical risk, a three item composite scale for the instructor, and 4 composite scales regarding the perceived restorativeness of the setting (being away, fascination, coherence, and compatibility). The results of the MR analyses indicated that both activity and setting characteristics were important for predicting restorative outcomes (see TABLE 3.5).

Immediate Rejuvenation Scale (IRS)

The stepwise multiple regression analysis for the immediate rejuvenation scale found four significant predictors. Four characteristics from the recreation experience, two setting and two activity variables entered the regression equation at a statistically significant level. These four variables produced an R^2 of .487, indicating that they explain approximately 48% of the variation in rejuvenation measures. Those respondents who

TABLE 3.5: Predictive relationships among recreational activity characteristics, recreational environments, and psychologically restorative outcomes

<i>Independent Variables</i>	β
“Immediately following activity”	
<i>Rejuvenation</i>	(N=418)
being away	.592***
physical challenge	.140***
mental challenge	.091*
compatibility	.088*
coherence	-.092*
R ² = .487	
“In the past few days”	
<i>Effective Functioning</i>	(N=377)
compatibility	.226***
autonomy (-)	.141**
autonomy (+)	.114*
physical challenge	-.145**
R ² = .115	
“In the past few weeks”	
<i>Perceived Stress</i>	(N=417)
mental challenge	.146**
autonomy (+)	-.124*
compatibility	-.122*
R ² = .052	
<i>Positive Affect</i>	(N=407)
compatibility	.236***
autonomy (+)	.101*
R ² = .073	
<i>Negative Affect</i>	(N=407)
coherence	.203***
compatibility	-.167***
autonomy (+)	-.138**
R ² = .096	

* $p < .05$ ** $p < .01$ *** $p < .001$

reported the recreational setting as containing higher levels of “being away” elements ($\beta=.592$), “physical challenge” in the activity ($\beta=.140$), “mental challenge” in the activity ($\beta=.091$), and reported a compatibility with the setting ($\beta=.088$) indicated higher immediate feelings of rejuvenation, energy levels, improved concentration, and overall

mood. On the other hand, those who reported high levels of setting “coherence” ($\beta = -.092$) reported lower levels of immediate rejuvenation.

Effective Functioning Scale (EFS)

The second part of TABLE 3.5 presents the results of the stepwise multiple regression analysis for the Effective Functioning Scale (EFS). The EFS measured students’ feelings of effectiveness “*in the past few days*” time frame. Four characteristics, one setting and three activity variables entered the regression equation at a statistically significant level. These four variables produced an R^2 of .115, explaining approximately 11% of the variance in feelings of effective functioning. Those who rated the recreational setting with high levels of “compatibility” ($\beta = .226$) and reported higher autonomy for both the negative statement (-) ($\beta = .141$) (reverse coded) and the positive statement (+) ($\beta = .114$) were more likely to exhibit feelings of being effective, while those who perceived more “physical challenge” ($\beta = -.145$) in the activity were less likely to experience feelings of being effective.

Perceived Stress

The third part of TABLE 3.5 presents the results of the regression analysis for measures of perceived stress. The perceived stress scale was measured with a “*in the past few weeks*” time frame. Three variables entered into the regression analysis at a significant level: two activity characteristics and one setting characteristic. These three variables produced an R^2 of .052, explaining approximately 5% of the variance in perceived stress. Those who rated the activity as having “mental challenge” ($\beta = .146$) were more likely to experience stressful feelings. On the other hand, those who felt there

was more “autonomy (-)” ($\beta=-.124$) within the activity and “compatibility” ($\beta=-.122$) with the setting were more likely to experience lower levels of perceived stress.

Positive Affect

The fourth part of TABLE 3.5 presents the results of the regression analysis for general positive affect. The positive affect scale was measured with a “*in the past few weeks*” time frame. Two variables entered the analysis at a statistically significant level: one setting component and one activity characteristic. These two variables produced an R^2 of .073, explaining approximately 7% of the variation in positive affect. Those who felt there was “compatibility” ($\beta=.236$) with the setting and sensed “autonomy (-)” ($\beta=.101$) within the activity were more likely to experience feelings of positive affect.

Negative Affect

The fifth part of TABLE 3.5 presents the results of the regression analysis for general negative affect. The negative affect scale was measured with a “*in the past few weeks*” time frame. Three variables entered into the regression analysis at a statistically significant level: two setting variables and one activity characteristic. These three variables produced an R^2 of .096, explaining approximately 9-10% of the variation in general negative affect. Those who reported “coherence” ($\beta=.203$) with the setting were more likely to show signs of negative affect, while those who rated the “compatibility” ($\beta=-.167$) in the setting and “autonomy” ($\beta=-.138$) higher within the activity were less likely to experience negative affect.

Discussion

It should be noted that demographic characteristics were not controlled for in the stepwise multiple regressions reported here. It may be that there are demographic differences in both the kinds of recreational activities and settings a person chooses, and the kinds of outcomes they are likely to experience, quite apart from any direct impact of the activities and settings on outcomes. Future analyses of these data should address whether these findings remain when demographics variables are controlled. Nonetheless, the pattern of findings here is intriguing in a number of respects.

First, the recreational setting and activity characteristics may be more influential on restorative outcomes in the short-term than in the longer-term (i.e. rejuvenation measures with $R^2 = .487$ and stress measures with $R^2 = .052$). Second, components of both activity and setting seemed to be important. Each dependent variable was predicted by a combination of the two concepts. Third, challenge in the activity was most influential in the short-term: rejuvenation and effective functioning, but was also predictive of perceived stress; in addition, compatibility and autonomy were important predictors for all outcomes except the immediate rejuvenation scale. From these findings, it appears that different setting and activity variables may influence short and long-term restoration.

Recreational activity and setting characteristics showed the greatest predictive accuracy in feelings of rejuvenation, a short-term measure, with nearly 50 percent ($R^2 = .487$) of the variance being explained. As the time frame lengthens, the predictive accuracy of recreational activity and setting characteristics begins to diminish (effective functioning $R^2 = .115$, perceived stress $R^2 = .052$, positive affect $R^2 = .073$, and negative

affect $R^2 = .096$). This assumption is reinforced by the strong influence of the “being away” variable ($\beta = .592, p < .001$). By nature, “being away” is only experienced when one is separated from “routine” in the immediate time frame and cannot be experienced after one returns to their business as usual although the impacts may last longer. With mostly undergraduates (97.5%) a “quick-fix” for rejuvenation and restorative effects may be the primary concern in classes utilizing recreational activities as the curriculum. Anecdotal evidence points to the fact that these classes serve as a break from regular school schedules, but are uniquely built into a student’s regular class schedule, rather than having to perform the activity on one’s discretionary time outside of school.

Combinations of both setting and activity characteristics seem to be important in predicting restorative outcomes. In all regression analyses, a combination of these concepts can be observed. This lends credence to the environmental psychology literature that emphasizes the fact that people’s restoration is shaped by an interaction between the participants’ actions and the physical environment. This point reinforces Stokols & Altman’s (1987) position that an ecological or holistic perspective is needed when examining human behavior.

Additionally, autonomy appears to be very important in predicting higher levels of effective functioning, lower perceived stress, higher positive affect and lower negative affect. Interestingly, all of these measures are referenced with a long time frame. In particular, the respondents that do not feel hindered and limited by the rules and boundaries of the activity received increased restorative outcomes.

Looking more closely at which components affect short and longer-term measures suggests that certain variables influence each. For short-term dependent variables, challenge and a sense of being away are more evident. As the time frame for the dependent measures lengthens, compatibility and autonomy become consistent predictors. What seems to be necessary for restorative outcomes to occur is a compatible relationship, which is an alignment of what the subject desires from the environment and what the environment can afford. This process takes place within the setting/activity interaction and is closely related to the concept of leisure affordances (Kleiber, 2005; Pierskalla, 1998). The concept of leisure affordances emphasizes the importance of the perceiver to detect and discover the information available within the environment further reinforcing a holistic or ecological perspective to restorative outcomes.

From these findings, it seems that more research is needed to understand leisure affordances and the ecological nature of a recreation environment. The possibility of using a similar study with recreation agencies that offer programs to diverse age groups may shed light on the immediate nature of most of the current findings. Perhaps different trends exist with older adults and senior citizens concerning benefits afforded to them by specific types of recreational programs. This study was purely exploratory but points to other directions for more focused inquiries on restorative outcomes coming from an interaction of forces in the recreational setting and actions with the environment.

For practitioners, these findings point to programming options for recreation departments wishing to become more “benefits-based” in their programming. Specifically for college-aged persons involved in recreational programs, these findings reveal that

outcomes in the immediate may be more affected by the characteristics of the activity and setting than longer-term outcomes. University recreation centers may be able market these types of classes with intent of offering immediate rejuvenation and stress relief.

Creating recreational environments that lead to focused benefits is one implication of the current findings. Initially, programs seem to benefit users most by providing a separation from their source of mental fatigue. Designing actual fitness rooms and areas that offer this element may be just as beneficial as the program itself. The role of the instructor is also important. Having a leader that motivates one through an activity was also important to feeling immediate rejuvenation. This can guide managers in selecting personnel that meet the needs of the program or class.

A possible interaction and associative effect between autonomy and challenge may be the single most important factor for the activity as shown from these findings. Having the appropriate level of challenge within an activity allows participants to realize their potential and ability when participating in a new activity or improving upon existing skills. This might mean creating different programs specifically for novice, intermediate, and advanced user groups. Not separating these types of users can result in boredom or anxiety for participants. Autonomy within an activity also seems to be important in these analyses. Creating environments that support autonomy allows users to experience a sense of control in the activity and make the benefits and outcomes their own. Meaning that anything that a person may receive from an activity, in terms of benefits and outcomes, becomes the result of the person participating in such a way that those results came from their thoughts and actions while in the activity. Creating recreational

environments that balance autonomy and challenge seems to be important factor for beneficial participation.

Finally, the consistent presence of setting characteristics supports the ideas put forth by ART. The setting does play an important role in restorative outcomes. However, the setting characteristics could be describing how a person feels during an activity. It's quite possible that the participants were actually describing how the combined setting/activity made them feel, and not just how the setting would make them feel. Without giving the participants an in-depth explanation of the measurements, the distinction between how the activity makes them feel and how the setting makes them feel may not be separated. These considerations along with the long-term results suggest that there are many other intervening variables that influence restorative outcomes and future research is necessary to better understand this relationship.

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CHAPTER FOUR

LIMITATIONS OF STUDY

There are limitations of the present study that must be addressed so that a full understanding of the results and conclusions can be made. With the manner in which the data was collected, there is the potential for a “nesting effect” in which any one class brings about similar outcomes simply because all of the individuals in the class are experiencing the same type of activity and setting. Similar limitations exist for demographic variables and non-participation: the sample came from a non-random selection, not all activities were represented, variation in variables can be lacking, no control groups were utilized, and individual histories were not accounted for.

In terms of a “nesting effect,” an interclass correlation test (ICC) was run in order to determine if class membership influenced the scores on the dependent variables. Results from this test shows that for Effective Functioning, Perceived Stress, and Positive Affect, there was no evidence of nesting. For Immediate Rejuvenation (.065) and Negative Affect (.045), there was marginal evidence that nesting was occurring. The general rule is that for ICC scores over .10, a Hierarchal Linear Model analysis or Nested ANOVA is needed to account for this effect. But the ICC results appear to indicate that no additional analysis is needed.

The respondents selected were not controlled for demographically and did not come from a random sample. As no control was used for demographics as well as for any persons not enrolled in LS classes, the research is limited. The classes were utilized as they became available from instructor approval. Being a non-random assignment could

potentially affect the data. Additionally, not all activities were accounted for in this study. During the spring 2007 semester, 40 different activities were available, while this study was able to capture only 18 distinct activities. Similarly, no control groups were used in this study to account for university students that were not participating in Leisure Skills classes during the spring 2007 semester. In addition, there is no way to know for sure that freely chosen recreational activities were not undertaken in addition to the Leisure Skills curriculum. These potential additional activities could also affect the findings of the study. Finally there was limited variability in scores of some independent variables used in the analysis. Autonomy, for example, tended to be experienced at a high level by a majority of the respondents in all activities. Physical and mental challenge related questions were also skewed to extremes in some cases.

Individual personal history was not investigated and may influence individual's choice of activity and the outcomes received. Past experience with certain activities, both positive or negative, can also affect how respondents perceive their recreational activities and associated settings. Additionally, students "self selected" the type of recreational activity and setting which may have influenced the associated outcomes. For example, women or graduating seniors may be more inclined to enroll in certain types of activities.

Finally, it must be noted that there remains unstudied intervening variables that affect mental restoration and associated outcomes. The most predictive model accounted for only about 50% of the variance associated with the immediate outcome of a recreational experience. Additional research needs to be undertaken to investigate these intervening variables and their influence on restorative outcomes.

CHAPTER FIVE

GENERAL CONCLUSIONS

From a general perspective, these findings have many practical as well as academic implications for the field of recreation programming and restoration research. For the practitioner, it seems that many precise activity characteristics can influence positive outcomes. Understanding the interaction and potential influence of a range of activity and setting characteristics on restoration is critical. For restoration researchers, this work provides another perspective on how activity and setting may interact to produce restorative outcomes.

From these findings, it can be safely said that the recreational environment as well as the activities that take place within them affect one's mental restoration. The strongest finding suggests that in terms of the immediate outcomes, designers and programmers of recreational activities can play a pivotal role in contributing to the positive benefits that can be gained through participation in recreational activities.

Specifically, autonomy seemed to be an important factor in both sets of analysis when examining restorative outcomes. Creating environments that foster a sense of recreational autonomy appears to improve the possibility of participants receiving these type of benefits. Findings suggest that perceived autonomy within the activity/setting experience increases the restorative potential and the associated benefits. The activity/setting dynamic affords people the means to achieve restorative outcomes.

Interacting with autonomy, the physical challenge of an activity also appears to be influential. Directions for programmers may lead to creating specifically designed classes

and programs that match physical challenge with user groups on a skill level basis (novice, intermediate, advanced) or self-described desired outcomes.

Educating the clientele of any park and recreation operation may be a potential implication as well. Marketing one's programs and activities as being able to immediately reduce stress levels and depressive moods, can be very advantageous when trying to create customer loyalty. Informing the customers about the benefits of regular participation in recreational programs can lead to a better understanding of local recreation agencies essential role in a community.

This perspective seems to be a strategy used by a Benefits Based Programming approach. Engineering activities and programs to gain specific benefits is an underlying theme surrounding these findings. Incorporating certain elements into an activity and even into a setting seems to bring about intentional, desired outcomes. The results presented here provide a direction for this type of programming strategy.

Utilizing the results and discussion from these studies can result in an enhanced perspective when designing and programming recreational activities and offerings. By taking into account the potential influence of different recreational settings and activity characteristics can greatly influence the direction of recreational agencies and recreation providers to achieve the greatest possible success.

APPENDICES

Appendix A

Individual Class Statistics

Independent Variables

Note: In this appendix, autonomy (-) denotes negatively worded statement with reversed coding, autonomy (+) denotes positively worded statement

Class	<i>Independent Variable</i>	<i>Mean (S.D.)</i>	Class	<i>Independent Variable</i>	<i>Mean (S.D.)</i>
Backpacking			Road Biking		
	<i>Activity IVs</i>			<i>Activity IVs</i>	
	Autonomy (-)	3.11 (0.78)		Autonomy (-)	4.50 (0.58)
	Autonomy (+)	4.22 (0.67)		Autonomy (+)	4.00 (0.82)
	Competence/Skill Index	3.55 (0.53)		Competence/Skill Index	3.50 (0.58)
	Physical Challenge Index	3.00 (0.00)		Physical Challenge Index	2.25 (0.96)
	Mental Challenge	3.22 (0.97)		Mental Challenge	2.75 (0.96)
	Perceived Risk	3.11 (0.78)		Perceived Risk	3.50 (1.00)
	<i>Setting IVs</i>			<i>Setting IVs</i>	
	Perceived Naturalness	2.56 (0.53)		Perceived Naturalness	1.75 (0.50)
	“being away” (BA)	11.78 (1.92)		“being away” (BA)	11.75 (0.96)
	“fascination” (FA)	30.44 (2.60)		“fascination” (FA)	27.25 (3.50)
	“coherence” (COH)	9.00 (3.87)		“coherence” (COH)	11.50 (4.04)
	“compatibility” (COM)	26.56 (3.75)		“compatibility” (COM)	28.00 (2.71)
Mountain Biking			Bowling – 1		
	<i>Activity IVs</i>			<i>Activity IVs</i>	
	Autonomy (-)	4.45 (1.04)		Autonomy (-)	4.67 (0.84)
	Autonomy (+)	4.64 (0.50)		Autonomy (+)	4.17 (0.97)
	Competence/Skill Index	3.36 (0.92)		Competence/Skill Index	3.33 (0.77)
	Physical Challenge Index	2.64 (0.50)		Physical Challenge Index	1.56 (0.51)
	Mental Challenge	2.91 (0.83)		Mental Challenge	2.72 (1.07)
	Perceived Risk	3.82 (0.60)		Perceived Risk	2.17 (0.71)
	<i>Setting IVs</i>			<i>Setting IVs</i>	
	Perceived Naturalness	2.91 (0.30)		Perceived Naturalness	1.33 (0.59)
	“being away” (BA)	11.73 (1.35)		“being away” (BA)	10.56 (2.48)
	“fascination” (FA)	27.27 (4.82)		“fascination” (FA)	17.94 (5.17)
	“coherence” (COH)	8.36 (3.14)		“coherence” (COH)	7.67 (4.00)
	“compatibility” (COM)	30.64 (3.85)		“compatibility” (COM)	23.94 (8.57)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Bowling – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.79 (0.80)
	Autonomy (+)	3.64 (0.93)
	Competence/Skill Index	3.64 (0.63)
	Physical Challenge Index	1.36 (0.63)
	Mental Challenge	2.71 (0.91)
	Perceived Risk	1.64 (0.63)
<i>Setting IVs</i>		
	Perceived Naturalness	1.21 (0.43)
	“being away” (BA)	11.36 (2.76)
	“fascination” (FA)	15.93 (5.73)
	“coherence” (COH)	6.93 (3.85)
	“compatibility” (COM)	22.86 (6.14)
Dance – Beginning		
<i>Activity IVs</i>		
	Autonomy (-)	4.15 (1.18)
	Autonomy (+)	3.70 (0.92)
	Competence/Skill Index	2.90 (0.79)
	Physical Challenge Index	1.45 (0.60)
	Mental Challenge	2.25 (0.97)
	Perceived Risk	1.45 (0.69)
<i>Setting IVs</i>		
	Perceived Naturalness	1.50 (0.69)
	“being away” (BA)	8.15 (2.98)
	“fascination” (FA)	14.05 (5.94)
	“coherence” (COH)	7.50 (3.32)
	“compatibility” (COM)	18.80 (4.49)
Dance – Hip Hop		
<i>Activity IVs</i>		
	Autonomy (-)	4.53 (0.72)
	Autonomy (+)	4.47 (0.62)
	Competence/Skill Index	3.29 (0.99)
	Physical Challenge Index	2.29 (0.77)
	Mental Challenge	2.41 (1.00)
	Perceived Risk	2.12 (0.78)
<i>Setting IVs</i>		
	Perceived Naturalness	1.24 (0.56)
	“being away” (BA)	10.12 (3.06)
	“fascination” (FA)	13.24 (7.01)
	“coherence” (COH)	7.65 (3.66)
	“compatibility” (COM)	19.69 (7.52)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Field Hockey		
<i>Activity IVs</i>		
	Autonomy (-)	4.22 (1.17)
	Autonomy (+)	3.83 (0.92)
	Competence/Skill Index	3.28 (0.96)
	Physical Challenge Index	2.67 (0.59)
	Mental Challenge	3.11 (0.90)
	Perceived Risk	3.89 (0.68)
<i>Setting IVs</i>		
	Perceived Naturalness	2.44 (0.51)
	“being away” (BA)	10.50 (2.48)
	“fascination” (FA)	15.50 (6.00)
	“coherence” (COH)	8.72 (3.59)
	“compatibility” (COM)	23.44 (3.99)
Fitness Walking		
<i>Activity IVs</i>		
	Autonomy (-)	4.69 (0.63)
	Autonomy (+)	4.46 (0.52)
	Competence/Skill Index	4.08 (0.76)
	Physical Challenge Index	1.92 (0.49)
	Mental Challenge	2.00 (0.71)
	Perceived Risk	1.85 (0.69)
<i>Setting IVs</i>		
	Perceived Naturalness	2.23 (0.44)
	“being away” (BA)	10.77 (1.83)
	“fascination” (FA)	24.54 (5.17)
	“coherence” (COH)	6.92 (3.09)
	“compatibility” (COM)	25.77 (4.02)
Fly Tying		
<i>Activity IVs</i>		
	Autonomy (-)	4.70 (0.48)
	Autonomy (+)	4.20 (0.63)
	Competence/Skill Index	2.90 (0.99)
	Physical Challenge Index	1.10 (0.32)
	Mental Challenge	2.80 (1.14)
	Perceived Risk	1.50 (0.71)
<i>Setting IVs</i>		
	Perceived Naturalness	1.00 (0.00)
	“being away” (BA)	10.70 (1.95)
	“fascination” (FA)	12.30 (5.77)
	“coherence” (COH)	5.80 (2.30)
	“compatibility” (COM)	20.50 (8.00)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Golf – 1		
<i>Activity IVs</i>		
	Autonomy (-)	4.77 (0.44)
	Autonomy (+)	4.23 (0.73)
	Competence/Skill Index	3.38 (0.87)
	Physical Challenge Index	1.31 (0.48)
	Mental Challenge	3.77 (1.17)
	Perceived Risk	1.69 (0.63)
<i>Setting IVs</i>		
	Perceived Naturalness	2.00 (0.41)
	“being away” (BA)	10.38 (1.66)
	“fascination” (FA)	20.23 (6.06)
	“coherence” (COH)	6.23 (3.27)
	“compatibility” (COM)	28.46 (3.78)
Golf – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.54 (0.52)
	Autonomy (+)	3.92 (0.64)
	Competence/Skill Index	3.31 (0.63)
	Physical Challenge Index	1.69 (0.75)
	Mental Challenge	4.08 (1.19)
	Perceived Risk	1.62 (0.65)
<i>Setting IVs</i>		
	Perceived Naturalness	2.15 (0.38)
	“being away” (BA)	10.62 (1.19)
	“fascination” (FA)	19.62 (6.24)
	“coherence” (COH)	5.31 (2.02)
	“compatibility” (COM)	24.15 (5.70)
Hunting Traditions		
<i>Activity IVs</i>		
	Autonomy (-)	4.20 (0.77)
	Autonomy (+)	4.27 (0.70)
	Competence/Skill Index	3.73 (0.88)
	Physical Challenge Index	1.60 (0.83)
	Mental Challenge	3.07 (1.03)
	Perceived Risk	3.33 (1.29)
<i>Setting IVs</i>		
	Perceived Naturalness	2.27 (0.46)
	“being away” (BA)	11.13 (2.67)
	“fascination” (FA)	27.33 (6.15)
	“coherence” (COH)	8.07 (3.58)
	“compatibility” (COM)	28.27 (6.41)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Flatwater Kayaking		
<i>Activity IVs</i>		
	Autonomy (-)	4.55 (0.69)
	Autonomy (+)	3.91 (0.83)
	Competence/Skill Index	2.73 (0.90)
	Physical Challenge Index	1.82 (0.60)
	Mental Challenge	2.18 (1.25)
	Perceived Risk	2.36 (0.92)
<i>Setting IVs</i>		
	Perceived Naturalness	2.64 (0.50)
	“being away” (BA)	10.82 (2.79)
	“fascination” (FA)	25.36 (8.55)
	“coherence” (COH)	6.73 (2.53)
	“compatibility” (COM)	26.09 (6.25)
Whitewater Kayaking – 1		
<i>Activity IVs</i>		
	Autonomy (-)	4.36 (0.50)
	Autonomy (+)	3.91 (0.83)
	Competence/Skill Index	3.09 (1.14)
	Physical Challenge Index	2.18 (0.75)
	Mental Challenge	3.27 (0.90)
	Perceived Risk	3.27 (0.79)
<i>Setting IVs</i>		
	Perceived Naturalness	2.36 (0.50)
	“being away” (BA)	11.82 (1.66)
	“fascination” (FA)	24.55 (7.62)
	“coherence” (COH)	9.91 (4.99)
	“compatibility” (COM)	25.00 (5.85)
Whitewater Kayaking – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.22 (0.83)
	Autonomy (+)	3.89 (0.78)
	Competence/Skill Index	2.67 (1.00)
	Physical Challenge Index	2.44 (0.53)
	Mental Challenge	3.00 (0.87)
	Perceived Risk	3.44 (0.88)
<i>Setting IVs</i>		
	Perceived Naturalness	2.78 (0.44)
	“being away” (BA)	11.11 (2.62)
	“fascination” (FA)	25.22 (5.85)
	“coherence” (COH)	7.11 (2.26)
	“compatibility” (COM)	28.22 (2.95)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Racquetball – 1		
<i>Activity IVs</i>		
	Autonomy (-)	4.91 (0.30)
	Autonomy (+)	4.36 (0.81)
	Competence/Skill Index	3.18 (0.87)
	Physical Challenge Index	2.82 (0.40)
	Mental Challenge	3.18 (0.87)
	Perceived Risk	2.82 (0.87)
<i>Setting IVs</i>		
	Perceived Naturalness	1.09 (0.30)
	“being away” (BA)	11.09 (1.92)
	“fascination” (FA)	16.27 (6.59)
	“coherence” (COH)	9.64 (7.03)
	“compatibility” (COM)	26.40 (4.62)
Racquetball – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.64 (0.50)
	Autonomy (+)	3.82 (1.25)
	Competence/Skill Index	3.27 (0.65)
	Physical Challenge Index	2.45 (0.69)
	Mental Challenge	2.73 (0.65)
	Perceived Risk	3.00 (0.63)
<i>Setting IVs</i>		
	Perceived Naturalness	1.09 (0.30)
	“being away” (BA)	9.73 (1.49)
	“fascination” (FA)	11.27 (4.65)
	“coherence” (COH)	6.73 (2.72)
	“compatibility” (COM)	22.55 (5.24)
Racquetball – 3		
<i>Activity IVs</i>		
	Autonomy (-)	4.64 (0.67)
	Autonomy (+)	3.64 (0.81)
	Competence/Skill Index	3.64 (0.50)
	Physical Challenge Index	2.64 (0.67)
	Mental Challenge	3.45 (0.93)
	Perceived Risk	3.00 (0.77)
<i>Setting IVs</i>		
	Perceived Naturalness	1.18 (0.40)
	“being away” (BA)	11.18 (2.14)
	“fascination” (FA)	16.45 (7.99)
	“coherence” (COH)	6.36 (2.66)
	“compatibility” (COM)	24.64 (5.08)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Riflery – 1		
<i>Activity IVs</i>		
	Autonomy (-)	4.64 (0.67)
	Autonomy (+)	4.45 (0.69)
	Competence/Skill Index	3.64 (0.67)
	Physical Challenge Index	1.27 (0.47)
	Mental Challenge	3.09 (0.83)
	Perceived Risk	3.36 (0.92)
<i>Setting IVs</i>		
	Perceived Naturalness	2.20 (0.42)
	“being away” (BA)	11.55 (2.21)
	“fascination” (FA)	21.91 (6.66)
	“coherence” (COH)	5.73 (3.23)
	“compatibility” (COM)	27.55 (5.15)
Riflery – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.50 (0.85)
	Autonomy (+)	3.79 (0.80)
	Competence/Skill Index	3.93 (0.47)
	Physical Challenge Index	1.00 (0.00)
	Mental Challenge	3.07 (0.92)
	Perceived Risk	3.36 (1.28)
<i>Setting IVs</i>		
	Perceived Naturalness	2.14 (0.36)
	“being away” (BA)	10.50 (2.65)
	“fascination” (FA)	20.79 (6.14)
	“coherence” (COH)	5.07 (1.49)
	“compatibility” (COM)	27.00 (6.50)
Rock Climbing		
<i>Activity IVs</i>		
	Autonomy (-)	4.58 (0.51)
	Autonomy (+)	4.50 (0.67)
	Competence/Skill Index	3.00 (0.43)
	Physical Challenge Index	2.75 (0.45)
	Mental Challenge	3.42 (0.79)
	Perceived Risk	2.83 (0.83)
<i>Setting IVs</i>		
	Perceived Naturalness	1.33 (0.49)
	“being away” (BA)	10.92 (2.35)
	“fascination” (FA)	26.33 (4.21)
	“coherence” (COH)	7.33 (2.96)
	“compatibility” (COM)	27.33 (3.73)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Soccer		
<i>Activity IVs</i>		
	Autonomy (-)	4.14 (0.91)
	Autonomy (+)	3.95 (0.74)
	Competence/Skill Index	3.38 (1.12)
	Physical Challenge Index	2.24 (0.62)
	Mental Challenge	2.81 (1.03)
	Perceived Risk	2.71 (0.90)
<i>Setting IVs</i>		
	Perceived Naturalness	2.48 (0.51)
	“being away” (BA)	10.71 (2.05)
	“fascination” (FA)	17.05 (5.04)
	“coherence” (COH)	6.19 (2.79)
	“compatibility” (COM)	24.90 (5.60)
Ultimate Frisbee		
<i>Activity IVs</i>		
	Autonomy (-)	4.85 (0.37)
	Autonomy (+)	3.80 (0.95)
	Competence/Skill Index	3.60 (0.82)
	Physical Challenge Index	2.60 (0.60)
	Mental Challenge	2.80 (0.89)
	Perceived Risk	3.50 (0.95)
<i>Setting IVs</i>		
	Perceived Naturalness	2.70 (0.47)
	“being away” (BA)	11.65 (1.31)
	“fascination” (FA)	20.26 (6.85)
	“coherence” (COH)	9.40 (4.71)
	“compatibility” (COM)	25.05 (4.74)
Yoga – Kripalu – 1		
<i>Activity IVs</i>		
	Autonomy (-)	4.86 (0.35)
	Autonomy (+)	4.45 (1.06)
	Competence/Skill Index	3.05 (0.90)
	Physical Challenge Index	2.23 (0.69)
	Mental Challenge	2.86 (0.91)
	Perceived Risk	2.38 (0.86)
<i>Setting IVs</i>		
	Perceived Naturalness	1.81 (0.75)
	“being away” (BA)	12.33 (2.11)
	“fascination” (FA)	18.20 (9.16)
	“coherence” (COH)	5.18 (1.87)
	“compatibility” (COM)	26.23 (5.73)

Class	<i>Independent Variable</i>	<i>Mean (S.D)</i>
Yoga – Kripalu – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.40 (0.88)
	Autonomy (+)	4.35 (0.81)
	Competence/Skill Index	3.16 (0.76)
	Physical Challenge Index	2.30 (0.47)
	Mental Challenge	3.20 (1.15)
	Perceived Risk	2.60 (0.82)
<i>Setting IVs</i>		
	Perceived Naturalness	1.80 (0.62)
	“being away” (BA)	10.50 (2.35)
	“fascination” (FA)	19.20 (6.65)
	“coherence” (COH)	6.40 (2.16)
	“compatibility” (COM)	22.05 (6.10)
Yoga – Vinyasa – 1		
<i>Activity IVs</i>		
	Autonomy (-)	4.73 (0.59)
	Autonomy (+)	4.40 (0.91)
	Competence/Skill Index	2.67 (0.72)
	Physical Challenge Index	2.60 (0.51)
	Mental Challenge	3.13 (1.36)
	Perceived Risk	2.13 (0.64)
<i>Setting IVs</i>		
	Perceived Naturalness	1.60 (0.63)
	“being away” (BA)	10.67 (2.58)
	“fascination” (FA)	17.73 (7.61)
	“coherence” (COH)	6.80 (4.14)
	“compatibility” (COM)	22.27 (5.93)
Yoga – Vinyasa – 2		
<i>Activity IVs</i>		
	Autonomy (-)	4.33 (1.15)
	Autonomy (+)	3.71 (1.15)
	Competence/Skill Index	2.90 (0.62)
	Physical Challenge Index	2.52 (0.51)
	Mental Challenge	3.00 (0.95)
	Perceived Risk	2.29 (0.64)
<i>Setting IVs</i>		
	Perceived Naturalness	1.48 (0.60)
	“being away” (BA)	9.33 (3.38)
	“fascination” (FA)	15.33 (8.00)
	“coherence” (COH)	6.76 (3.40)
	“compatibility” (COM)	20.38 (6.92)

Class*Independent Variable***Yoga – Power***Activity IVs*

Autonomy (-)	4.60	(0.75)
Autonomy (+)	4.45	(0.94)
Competence/Skill Index	3.10	(0.85)
Physical Challenge Index	2.65	(0.49)
Mental Challenge	3.40	(0.99)
Perceived Risk	2.55	(0.76)

Setting IVs

Perceived Naturalness	1.45	(0.51)
“being away” (BA)	11.50	(2.28)
“fascination” (FA)	17.20	(7.25)
“coherence” (COH)	6.30	(3.20)
“compatibility” (COM)	24.60	(6.56)

**Yoga – Meditation and
Relaxation***Activity IVs*

Autonomy (-)	3.75	(1.29)
Autonomy (+)	4.08	(0.90)
Competence/Skill Index	3.25	(0.45)
Physical Challenge Index	1.33	(0.65)
Mental Challenge	3.17	(1.53)
Perceived Risk	1.42	(0.67)

Setting IVs

Perceived Naturalness	2.09	(0.54)
“being away” (BA)	9.92	(3.58)
“fascination” (FA)	18.67	(8.05)
“coherence” (COH)	8.42	(4.08)
“compatibility” (COM)	19.33	(7.76)

Dependent Variables

Backpacking (N=9)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 6; Females = 3	
GPA	3.11 (0.46)
<i>Independent Variables</i>	
Autonomy (-) ¹	3.11 (0.78)
Autonomy (+)	4.22 (0.67)
Mental challenge	3.22 (0.97)
Risk	3.11 (0.78)
Competence/Skill ²	7.33 (0.87)
Physical challenge ²	8.67 (0.87)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.67 (1.80)
Effective Functioning Scale	103.00 (15.68)
Perceived Stress Scale	12.44 (2.19)
Positive Affect	33.78 (5.43)
Negative Affect	23.89 (8.78)
Projected performance	3.33 (1.11)

¹ = item coding is reversed

² = 2-item scale

Mountain Biking (N=11)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 11	
GPA	3.19 (0.46)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.45 (1.04)
Autonomy (+)	4.64 (0.50)
Mental challenge	2.91 (0.83)
Risk	3.82 (0.60)
Competence/Skill ²	7.09 (1.64)
Physical challenge ²	7.73 (1.19)
<i>Dependent Variables</i>	
Immediate rejuvenation	17.09 (1.45)
Effective Functioning Scale	107.33 (19.99)
Perceived Stress Scale	10.00 (2.41)
Positive Affect	36.20 (9.26)
Negative Affect	20.09 (6.41)
Projected performance	3.55 (1.04)

¹ = item coding is reversed

² = 2-item scale

Road Biking (N=4)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 4	
GPA	3.25 (0.81)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.50 (0.58)
Autonomy (+)	4.00 (0.82)
Mental challenge	2.75 (0.96)
Risk	3.50 (1.00)
Competence/Skill ²	7.25 (1.50)
Physical challenge ²	6.75 (2.22)
<i>Dependent Variables</i>	
Immediate rejuvenation	16.75 (2.22)
Effective Functioning Scale	117.25 (14.71)
Perceived Stress Scale	9.25 (0.96)
Positive Affect	37.25 (5.32)
Negative Affect	17.25 (2.99)
Projected performance	3.25 (0.96)

¹ = item coding is reversed

² = 2-item scale

Bowling - 1 (N=18)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 13; Females = 4	
GPA	2.84 (0.57)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.67 (0.84)
Autonomy (+)	4.17 (0.92)
Mental challenge	2.72 (1.07)
Risk	2.17 (0.71)
Competence/Skill ²	7.39 (1.58)
Physical challenge ²	5.17 (1.42)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.72 (3.56)
Effective Functioning Scale	111.94 (16.67)
Perceived Stress Scale	9.56 (3.20)
Positive Affect	35.35 (7.65)
Negative Affect	17.06 (6.31)
Projected performance	3.71 (0.69)

¹ = item coding is reversed

² = 2-item scale

Bowling - 2 (N=14)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 9; Females = 5	
GPA	3.19 (0.63)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.79 (0.80)
Autonomy (+)	3.64 (0.93)
Mental challenge	2.71 (0.91)
Risk	1.64 (0.63)
Competence/Skill ²	7.64 (1.08)
Physical challenge ²	4.79 (1.42)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.36 (3.25)
Effective Functioning Scale	113.08 (17.25)
Perceived Stress Scale	9.57 (1.60)
Positive Affect	36.92 (5.95)
Negative Affect	16.17 (3.88)
Projected performance	3.79 (0.70)

¹ = item coding is reversed² = 2-item scale**Dance – Beginning (N=20)**

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 7; Females = 13	
GPA	3.46 (0.44)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.15 (1.18)
Autonomy (+)	3.70 (0.92)
Mental challenge	2.25 (0.97)
Risk	1.45 (0.69)
Competence/Skill ²	6.35 (1.31)
Physical challenge ²	4.75 (1.71)
<i>Dependent Variables</i>	
Immediate rejuvenation	12.80 (3.17)
Effective Functioning Scale	108.94 (18.34)
Perceived Stress Scale	10.50 (3.20)
Positive Affect	35.60 (6.01)
Negative Affect	21.55 (6.46)
Projected performance	3.15 (0.81)

¹ = item coding is reversed² = 2-item scale

Dance – Hip Hop (N=17)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 3; Females = 13	
GPA	3.18 (0.51)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.53 (0.72)
Autonomy (+)	4.47 (0.62)
Mental challenge	2.41 (1.00)
Risk	2.12 (0.78)
Competence/Skill ²	7.06 (1.68)
Physical challenge ²	7.18 (1.38)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.29 (3.53)
Effective Functioning Scale	109.81 (17.56)
Perceived Stress Scale	10.53 (2.35)
Positive Affect	37.35 (5.28)
Negative Affect	21.29 (9.04)
Projected performance	3.24 (0.97)

¹ = item coding is reversed

² = 2-item scale

Field Hockey (N=18)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 2; Females = 16	
GPA	3.26 (0.59)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.22 (1.17)
Autonomy (+)	3.83 (0.92)
Mental challenge	3.11 (0.90)
Risk	3.89 (0.68)
Competence/Skill ²	7.06 (1.95)
Physical challenge ²	7.72 (1.49)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.50 (3.26)
Effective Functioning Scale	102.81 (16.79)
Perceived Stress Scale	10.44 (2.01)
Positive Affect	33.31 (6.84)
Negative Affect	19.69 (3.65)
Projected performance	3.28 (0.96)

¹ = item coding is reversed

² = 2-item scale

Fitness Walking (N=13)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 2; Females = 11	
GPA	3.31 (0.66)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.69 (0.63)
Autonomy (+)	4.46 (0.52)
Mental challenge	2.00 (0.71)
Risk	1.85 (0.69)
Competence/Skill ²	8.62 (1.33)
Physical challenge ²	6.23 (1.01)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.85 (2.51)
Effective Functioning Scale	110.77 (18.57)
Perceived Stress Scale	9.38 (1.80)
Positive Affect	36.31 (6.22)
Negative Affect	17.38 (4.74)
Projected performance	3.38 (0.96)

¹ = item coding is reversed

² = 2-item scale

Fly Tying (N=10)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 9; Females = 1	
GPA	3.38 (0.44)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.70 (0.48)
Autonomy (+)	4.20 (0.63)
Mental challenge	2.80 (1.14)
Risk	1.50 (0.71)
Competence/Skill ²	6.30 (1.64)
Physical challenge ²	2.90 (1.29)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.30 (2.06)
Effective Functioning Scale	116.10 (12.93)
Perceived Stress Scale	9.00 (1.89)
Positive Affect	37.00 (5.73)
Negative Affect	19.10 (5.70)
Projected performance	3.50 (0.85)

¹ = item coding is reversed

² = 2-item scale

Golf – 1 (N=13)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 12; Females = 1	
GPA	3.20 (0.46)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.77 (0.44)
Autonomy (+)	4.23 (0.73)
Mental challenge	3.77 (1.17)
Risk	1.69 (0.63)
Competence/Skill ²	7.31 (1.65)
Physical challenge ²	5.15 (1.07)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.54 (2.50)
Effective Functioning Scale	112.92 (20.54)
Perceived Stress Scale	9.69 (2.63)
Positive Affect	35.67 (5.84)
Negative Affect	17.75 (6.98)
Projected performance	3.62 (0.77)

¹ = item coding is reversed

² = 2-item scale

Golf – 2 (N=13)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 13	
GPA	3.22 (0.55)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.54 (0.52)
Autonomy (+)	3.92 (0.64)
Mental challenge	4.08 (1.19)
Risk	1.62 (0.65)
Competence/Skill ²	7.00 (1.41)
Physical challenge ²	5.00 (2.20)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.61 (1.94)
Effective Functioning Scale	111.73 (11.98)
Perceived Stress Scale	10.85 (2.82)
Positive Affect	37.69 (3.92)
Negative Affect	18.62 (5.49)
Projected performance	2.85 (0.80)

¹ = item coding is reversed

² = 2-item scale

Hunting Traditions (N=15)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 12; Females = 1	
GPA	2.98 (0.58)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.20 (0.77)
Autonomy (+)	4.27 (0.70)
Mental challenge	3.07 (1.03)
Risk	3.33 (1.29)
Competence/Skill ²	8.00 (1.77)
Physical challenge ²	5.47 (1.64)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.60 (3.78)
Effective Functioning Scale	114.92 (15.10)
Perceived Stress Scale	9.64 (1.82)
Positive Affect	37.54 (4.24)
Negative Affect	17.46 (7.02)
Projected performance	3.36 (0.74)

¹ = item coding is reversed

² = 2-item scale

Flatwater Kayaking (N=11)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 3; Females = 7	
GPA	2.83 (0.57)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.55 (0.69)
Autonomy (+)	3.91 (0.83)
Mental challenge	3.27 (1.10)
Risk	2.45 (0.93)
Competence/Skill ²	5.73 (1.74)
Physical challenge ²	6.09 (1.14)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.27 (3.41)
Effective Functioning Scale	113.91 (16.05)
Perceived Stress Scale	9.18 (3.06)
Positive Affect	36.27 (5.61)
Negative Affect	20.36 (8.87)
Projected performance	3.10 (0.57)

¹ = item coding is reversed

² = 2-item scale

Whitewater Kayaking - 1 (N=11)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 6; Females = 5	
GPA	3.15 (0.55)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.36 (0.50)
Autonomy (+)	3.91 (0.83)
Mental challenge	3.27 (0.90)
Risk	3.27 (0.79)
Competence/Skill ²	6.64 (2.20)
Physical challenge ²	6.64 (1.21)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.64 (2.34)
Effective Functioning Scale	112.55 (8.36)
Perceived Stress Scale	9.18 (2.32)
Positive Affect	34.91 (5.86)
Negative Affect	16.45 (3.50)
Projected performance	2.64 (0.67)

¹ = item coding is reversed

² = 2-item scale

Whitewater Kayaking - 2 (N=9)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 6; Females = 3	
GPA	3.05 (0.41)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.22 (0.83)
Autonomy (+)	3.89 (0.78)
Mental challenge	3.00 (0.87)
Risk	3.44 (0.88)
Competence/Skill ²	5.89 (1.90)
Physical challenge ²	7.56 (1.13)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.00 (3.87)
Effective Functioning Scale	117.88 (8.04)
Perceived Stress Scale	9.33 (1.80)
Positive Affect	35.56 (6.65)
Negative Affect	18.78 (5.80)
Projected performance	2.67 (0.87)

¹ = item coding is reversed

² = 2-item scale

Racquetball – 1 (N=11)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 8; Females = 3	
GPA	3.07 (0.57)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.91 (0.30)
Autonomy (+)	4.36 (0.81)
Mental challenge	3.18 (0.87)
Risk	2.82 (0.87)
Competence/Skill ²	7.09 (1.51)
Physical challenge ²	8.45 (1.13)
<i>Dependent Variables</i>	
Immediate rejuvenation	16.82 (1.89)
Effective Functioning Scale	112.55 (13.00)
Perceived Stress Scale	10.18 (2.99)
Positive Affect	36.73 (5.48)
Negative Affect	19.82 (8.41)
Projected performance	3.18 (0.98)

¹ = item coding is reversed

² = 2-item scale

Racquetball – 2 (N=11)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 6; Females = 5	
GPA	3.51 (0.37)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.64 (0.50)
Autonomy (+)	3.82 (1.25)
Mental challenge	2.73 (0.65)
Risk	3.00 (0.63)
Competence/Skill ²	7.09 (1.45)
Physical challenge ²	7.45 (1.29)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.18 (1.54)
Effective Functioning Scale	106.40 (18.30)
Perceived Stress Scale	9.45 (1.92)
Positive Affect	35.73 (6.08)
Negative Affect	19.73 (5.90)
Projected performance	3.45 (0.52)

¹ = item coding is reversed

² = 2-item scale

Racquetball – 3 (N=11)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 11	
GPA	3.17 (0.49)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.64 (0.67)
Autonomy (+)	3.64 (0.81)
Mental challenge	3.45 (0.93)
Risk	3.00 (0.77)
Competence/Skill ²	7.82 (0.75)
Physical challenge ²	8.36 (1.57)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.64 (2.46)
Effective Functioning Scale	119.50 (10.58)
Perceived Stress Scale	8.73 (1.62)
Positive Affect	36.36 (5.37)
Negative Affect	16.36 (4.23)
Projected performance	3.73 (0.90)

¹ = item coding is reversed² = 2-item scale**Riflery – 1 (N=11)**

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 10; Females = 1	
GPA	3.07 (0.54)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.64 (0.67)
Autonomy (+)	4.45 (0.69)
Mental challenge	3.09 (0.83)
Risk	3.36 (0.92)
Competence/Skill ²	7.64 (1.21)
Physical challenge ²	4.27 (1.56)
<i>Dependent Variables</i>	
Immediate rejuvenation	16.36 (2.69)
Effective Functioning Scale	113.11 (14.88)
Perceived Stress Scale	9.45 (2.81)
Positive Affect	34.10 (5.97)
Negative Affect	15.80 (3.12)
Projected performance	3.27 (0.79)

¹ = item coding is reversed² = 2-item scale

Riflery – 2 (N=14)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 13; Females = 1	
GPA	3.07 (0.34)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.50 (0.85)
Autonomy (+)	3.79 (0.80)
Mental challenge	3.07 (0.92)
Risk	3.36 (1.28)
Competence/Skill ²	8.07 (1.07)
Physical challenge ²	3.79 (0.89)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.86 (3.48)
Effective Functioning Scale	114.46 (19.89)
Perceived Stress Scale	9.57 (2.85)
Positive Affect	36.23 (7.25)
Negative Affect	15.38 (4.79)
Projected performance	3.43 (1.02)

¹ = item coding is reversed

² = 2-item scale

Rock Climbing (N=12)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 8; Females = 4	
GPA	3.12 (0.67)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.58 (0.51)
Autonomy (+)	4.50 (0.67)
Mental challenge	3.42 (0.79)
Risk	2.83 (0.83)
Competence/Skill ²	6.67 (0.78)
Physical challenge ²	8.33 (1.23)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.00 (3.52)
Effective Functioning Scale	115.80 (13.44)
Perceived Stress Scale	10.58 (2.64)
Positive Affect	35.58 (7.08)
Negative Affect	17.75 (2.60)
Projected performance	3.33 (0.78)

¹ = item coding is reversed

² = 2-item scale

Soccer (N=20)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 16; Females = 4	
GPA	3.19 (0.42)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.14 (0.91)
Autonomy (+)	3.95 (0.74)
Mental challenge	2.81 (1.03)
Risk	2.71 (0.90)
Competence/Skill ²	7.19 (2.04)
Physical challenge ²	6.95 (1.20)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.55 (1.99)
Effective Functioning Scale	110.15 (11.81)
Perceived Stress Scale	10.40 (2.60)
Positive Affect	36.95 (4.32)
Negative Affect	18.95 (4.94)
Projected performance	3.05 (0.60)

¹ = item coding is reversed² = 2-item scale**Ultimate Frisbee (N=20)**

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 14; Females = 6	
GPA	3.17 (0.51)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.85 (0.37)
Autonomy (+)	3.80 (0.95)
Mental challenge	2.80 (0.89)
Risk	3.50 (0.95)
Competence/Skill ²	7.80 (1.44)
Physical challenge ²	7.90 (1.29)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.74 (2.21)
Effective Functioning Scale	103.47 (16.99)
Perceived Stress Scale	10.90 (2.27)
Positive Affect	35.15 (4.85)
Negative Affect	20.40 (8.51)
Projected performance	3.00 (0.97)

¹ = item coding is reversed² = 2-item scale

Yoga, Kripalu – 1 (N = 22)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 4; Females = 18	
GPA	3.13 (0.37)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.86 (0.35)
Autonomy (+)	4.45 (1.06)
Mental challenge	2.86 (0.91)
Risk	2.38 (0.86)
Competence/Skill ²	6.45 (1.84)
Physical challenge ²	6.82 (1.56)
<i>Dependent Variables</i>	
Immediate rejuvenation	17.05 (2.73)
Effective Functioning Scale	104.25 (17.08)
Perceived Stress Scale	10.95 (2.75)
Positive Affect	33.05 (7.69)
Negative Affect	19.41 (5.69)
Projected performance	3.00 (0.93)

¹ = item coding is reversed² = 2-item scale**Yoga, Kripalu – 2 (N = 21)**

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 2; Females = 18	
GPA	3.40 (0.46)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.40 (0.88)
Autonomy (+)	4.35 (0.81)
Mental challenge	3.20 (1.15)
Risk	2.60 (0.82)
Competence/Skill ²	6.74 (1.28)
Physical challenge ²	7.35 (1.18)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.70 (2.92)
Effective Functioning Scale	109.06 (18.57)
Perceived Stress Scale	11.30 (3.08)
Positive Affect	33.70 (8.00)
Negative Affect	19.90 (7.68)
Projected performance	3.40 (0.94)

¹ = item coding is reversed² = 2-item scale

Yoga – Vinyasa - 1 (N=15)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 3; Females = 12	
GPA	3.05 (0.69)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.73 (0.59)
Autonomy (+)	4.40 (0.91)
Mental challenge	3.13 (1.36)
Risk	2.13 (0.64)
Competence/Skill ²	5.87 (1.51)
Physical challenge ²	7.93 (1.33)
<i>Dependent Variables</i>	
Immediate rejuvenation	14.53 (3.44)
Effective Functioning Scale	99.55 (21.53)
Perceived Stress Scale	11.00 (2.14)
Positive Affect	33.07 (6.26)
Negative Affect	22.73 (7.06)
Projected performance	3.47 (1.19)

¹ = item coding is reversed

² = 2-item scale

Yoga – Vinyasa - 2 (N=21)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 1; Females = 19	
GPA	3.35 (0.38)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.33 (1.15)
Autonomy (+)	3.71 (1.15)
Mental challenge	3.00 (0.95)
Risk	2.29 (0.64)
Competence/Skill ²	6.38 (1.28)
Physical challenge ²	7.38 (1.16)
<i>Dependent Variables</i>	
Immediate rejuvenation	15.19 (4.08)
Effective Functioning Scale	104.88 (14.58)
Perceived Stress Scale	10.81 (2.73)
Positive Affect	35.79 (6.92)
Negative Affect	23.11 (7.63)
Projected performance	3.24 (1.04)

¹ = item coding is reversed

² = 2-item scale

Yoga - Power (N=20)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 8; Females = 12	
GPA	3.36 (0.32)
<i>Independent Variables</i>	
Autonomy (-) ¹	4.60 (0.75)
Autonomy (+)	4.45 (0.94)
Mental challenge	3.40 (0.99)
Risk	2.55 (0.76)
Competence/Skill ²	6.65 (1.60)
Physical challenge ²	8.05 (1.15)
<i>Dependent Variables</i>	
Immediate rejuvenation	18.10 (2.15)
Effective Functioning Scale	109.37 (18.51)
Perceived Stress Scale	9.95 (2.93)
Positive Affect	34.95 (6.75)
Negative Affect	19.75 (4.74)
Projected performance	3.53 (0.96)

¹ = item coding is reversed

² = 2-item scale

Yoga – Meditation and Relaxation (N=)

<i>Variable</i>	<i>Mean (S.D.)</i>
Males = 7; Females = 4	
GPA	3.16 (0.40)
<i>Independent Variables</i>	
Autonomy (-) ¹	3.75 (1.29)
Autonomy (+)	4.08 (0.90)
Mental challenge	3.17 (1.53)
Risk	1.42 (0.67)
Competence/Skill ²	7.16 (1.03)
Physical challenge ²	4.58 (1.98)
<i>Dependent Variables</i>	
Immediate rejuvenation	13.75 (4.09)
Effective Functioning Scale	97.90 (16.24)
Perceived Stress Scale	11.42 (4.03)
Positive Affect	31.00 (6.99)
Negative Affect	23.75 (8.93)
Projected performance	3.55 (1.21)

¹ = item coding is reversed

² = 2-item scale

Appendix B

Interclass Correlation Post Hoc Analysis

<i>Dependent Variable</i>	<i>Intercept</i>	<i>Residual</i>	<i>ICC-1</i>
Immediate Rejuvenation	0.621	8.816	0.065805
Effective Functioning	0.269	269.72	0.000996
Perceived Stress	0.177	6.72	0.025663
Positive Affect	Redundant		
Negative Affect	1.97	41.09	0.04575

Appendix C
Survey Instrument

Leisure Skills Activity

The following questions refer to the Leisure Skills activity that you are participating in. Please rate the activity according to the following questions:

I feel that the activity provides me with choices and options.

Strongly disagree

Strongly agree

I feel hindered and limited by the rules and boundaries of the activity.

Strongly disagree

Strongly agree

How would you describe the level of physical exertion required in the activity?

Very Low

Very High

What is your general level of competence (having the knowledge needed to adequately participate) in the activity?

No competence

Total competence

What is your general skill level within this activity?

Novice

Expert

How would you rate the general level of *physical* challenge within the activity?

No challenge

Very challenging

How would you rate the general level of *mental* challenge within the activity?

No challenge

Very challenging

How would you rate the general level of physical risk within the activity?

No risk *Very risky*

Please describe the primary physical setting where this activity takes place.

Completely Built *Semi-Built/Semi-Natural* *Completely Natural*

How many times a week do you participate in recreational activities outside of this class?

Leisure Skills Setting

The following questions refer to the setting in which you participate in your Leisure Skills activity. Please rate each statement according to the setting in which your Leisure Skills activity is participated in.

It is an escape experience

0-----1-----2-----3-----4-----5-----6

Not at all *A little* *Somewhat* *Completely*

Spending time here gives me a good break from my day-to-day routine

0-----1-----2-----3-----4-----5-----6

Not at all *A little* *Somewhat* *Completely*

The setting has fascinating qualities

0-----1-----2-----3-----4-----5-----6

Not at all *A little* *Somewhat* *Completely*

My attention is drawn to many interesting things

0-----1-----2-----3-----4-----5-----6

Not at all *A little* *Somewhat* *Completely*

I would like to get to know this place better

0-----1-----2-----3-----4-----5-----6

Not at all *A little* *Somewhat* *Completely*

There is much to explore and discover here

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

I would like to spend more time looking at the surroundings

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

There is too much going on here

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

It is a confusing place

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

There is a great deal of distraction

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

It is chaotic here

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

I can do things I like here

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

I have a sense that I belong here

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

I have a sense of oneness with this setting

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

Being here suits my personality

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

I could find ways to enjoy myself in place like this

0-----1-----2-----3-----4-----5-----6
Not at all *A little* *Somewhat* *Completely*

Considering the *LAST FEW DAYS*,
how often have you felt:

	<i>not at all</i>		<i>neutral</i>		<i>very much</i>
Everything was an effort	<input type="radio"/>				
You have a good sense of where you are going	<input type="radio"/>				
Not sure what's important anymore	<input type="radio"/>				
That life is interesting and challenging	<input type="radio"/>				
Satisfied with how things have going lately	<input type="radio"/>				
It's hard to make up your mind	<input type="radio"/>				
You were losing or misplacing things	<input type="radio"/>				
Energetic and excited about what you are doing	<input type="radio"/>				
Like you are not getting much accomplished	<input type="radio"/>				
On top of the world	<input type="radio"/>				
It's difficult to finish things you have started	<input type="radio"/>				
Able to get really absorbed in a task	<input type="radio"/>				
You were making mistakes	<input type="radio"/>				
Making decisions is difficult	<input type="radio"/>				
You can keep your mind on what you are doing	<input type="radio"/>				
You were jumping to conclusions	<input type="radio"/>				

Considering the *LAST FEW DAYS*,
 how would you rate yourself on
 each of these:

	<i>not at all</i>		<i>neutral</i>		<i>very much</i>
Alert	<input type="radio"/>				
Harried	<input type="radio"/>				
Effective	<input type="radio"/>				
Attentive	<input type="radio"/>				
Irritable	<input type="radio"/>				
Refreshed	<input type="radio"/>				
Clear	<input type="radio"/>				
Comfortable	<input type="radio"/>				
Disorganized	<input type="radio"/>				
Focused	<input type="radio"/>				
Positive	<input type="radio"/>				
Forgetful	<input type="radio"/>				
Patient	<input type="radio"/>				
Relaxed	<input type="radio"/>				
Competent	<input type="radio"/>				

The questions in this scale ask you about your feelings and thought during THE PAST FEW WEEKS. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate. Please circle the appropriate response.

In the last month, how often have you felt that you were unable to control the important things in your life?

1-----2-----3-----4-----5
Never Almost never Sometimes Fairly often Very often

In the last month, how often have you felt confident about your ability to handle your personal problems?

1-----2-----3-----4-----5
Never Almost never Sometimes Fairly often Very often

In the last month, how often have you felt that things were going your way?

1-----2-----3-----4-----5
Never Almost never Sometimes Fairly often Very often

In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

1-----2-----3-----4-----5
Never Almost never Sometimes Fairly often Very often

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during THE PAST FEW WEEKS.

1	2	3	4	5
<i>very slightly or not at all</i>	<i>a little</i>	<i>moderately</i>	<i>quite a bit</i>	<i>extremely</i>

<input type="checkbox"/> interested <input type="checkbox"/> distressed <input type="checkbox"/> excited <input type="checkbox"/> upset <input type="checkbox"/> strong <input type="checkbox"/> guilty <input type="checkbox"/> scared <input type="checkbox"/> hostile <input type="checkbox"/> enthusiastic <input type="checkbox"/> proud	<input type="checkbox"/> irritable <input type="checkbox"/> alert <input type="checkbox"/> ashamed <input type="checkbox"/> inspired <input type="checkbox"/> nervous <input type="checkbox"/> determined <input type="checkbox"/> attentive <input type="checkbox"/> jittery <input type="checkbox"/> active <input type="checkbox"/> afraid
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Background

How many years have you attended school?

<i>Elementary</i>	<i>High School</i>	<i>College</i>	<i>Graduate Study</i>
5 6 7 8	9 10 11 12	Fr. Soph. Jr. Sr. 13 14 15 16	17 18 19 20+

What is your major? _____

What is your current GPA? _____

What is your gender? Male Female

What is your age? _____

Which of the following represents your race or ethnic background?

<input type="checkbox"/> White, not of Hispanic descent	<input type="checkbox"/> Asian or Pacific Islander
<input type="checkbox"/> Black, not of Hispanic descent	<input type="checkbox"/> American Indian, Alaskan Native
<input type="checkbox"/> Hispanic	<input type="checkbox"/> Do not wish to answer

How do you feel you are performing, in terms of grades, GPA, etc., as compared to previous semesters?

<input type="radio"/>				
<i>Much worse</i>	<i>Worse</i>	<i>About the same</i>	<i>Better</i>	<i>Much better</i>