LEISURE LIFESTYLE AND HEALTH-RELATED PHYSICAL FITNESS FOR COLLEGE STUDENTS

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This article undertakes an analysis of exploring whether differences in health-related physical fitness existed among people possessing various leisure lifestyles. Physical Fitness Scales for Taiwan Citizens was utilized to measure samples' health-related physical fitness. Factor analysis on 241 college students resulted in four dimensions, namely, *dawn activity loving*, *sports loving*, *healthy diet, and vacation loving*. Next, using cluster analysis, the researchers identified four groups of college students, and they were *dawn activity lovers*, *sports lovers, indoor healthy dieters,* and *vacation lovers*. Finally, the researchers explore the relationship between the four groups and their health-related physical fitness using one-way ANOVA analysis. These results indicate that college students who engage in routine exercise tended to have superior physical fitness over those who do not exercise on a regular basis.

Key words: Health-related physical fitness, Leisure lifestyle, Factor analysis, Cluster analysis

Leisure has been a necessity and important for everyone. The adolescents have been in a critical period of personality development and social adaptability when they experienced substantial qualitative and quantitative changes in physical, psychological, emotional, moral, and social development. Therefore, appropriate leisure activities could help adolescents with future healthy growth and lifetime happiness(National Youth Commission，1993)

According to the findings from "Survey Results of Time Allocation by College Students," published by Statistics Division of Ministry of Education in February 2003, in their spare time, college students on average spent up to 2.8 hours (2 hours and 48 minutes) on internet each day, 2.06 hours (2 hours and 4 minutes) on school homework, 0.28 hours (17 minutes) on team activities, and 4.1 hours (4 hours and 6 minutes) on others activities. As a result, on average, time allocations of a college student were: 9.53 hours (40% of a day) necessary time, 5.23 hours (22%) restricted time, and 9.25 hours (38%) free time. College students have been highly independent and have ample time for personal planning of leisure activities and life. Without proper guidance or a correct concept of leisure, they could easily waste time in their precious youth. The school education and public policies should advocate strengthening public knowledge of leisure to nurture the concept of utilizing leisure time more effectively.

In this research, we study the contemporary leisure lifestyles and health-related physical fitness for college students. Our research problem can be formulated as*: How leisure lifestyles affect one's health-related physical fitness?* It has been specified in the following three research questions:
(1)   What dimensions characterize the leisure lifestyle for college students?
(2)   Which leisure lifestyle groups can be identified based on students' leisure lifestyle?
(3)   To what extent is students' health-related physical fitness to be predicted on the basis of their leisure lifestyles?

Lifestyle and leisure lifestyle

According to Hawkins & Coney(2004), lifestyle was how we live our life. Lazer (1963) stated that lifestyle is a systematic concept representing the characteristics of the life pattern of a society or a community that are distinct compared to the characteristics of any other society or community. Cook et al(2002) defined lifestyle as a way of living in terms of how people spent their time (activity), what they believe is important

(interest), and which things about themselves or surroundings they will take into consideration (opinion). Cordes & Ibrahim(1999) identified nine lifestyles existing in the U.S., and they are survivors, sustainers, belongers, emulators, achievers, I am me, experiential, socially conscious, and integrated. In short, lifestyle is the pattern of social life and behavior of an individual or a group.

Since 1970s, the concept of lifestyle has started to draw attention in the field leisure research. Perrault et al(1977) stated that individual lifestyle reflects individual activities, interests, and opinions, and, by analogy, various aspects of life which includes leisure behavior and vacation patterns. Leisure lifestyle refers to people's leisure-related behavior in terms of attitude, perception, and activity behavior in context of people's daily living(1981). In this research leisure lifestyle refers to people's daily leisure life pattern.

The task of quantification of lifestyle was originally called psychological statistics(Hawkins & Coney，2004). Psychological statistics measures lifestyle by AIO dimensions given by Wells & Tigert(1971) , AIO refers to: 1. Activity(A): referring to a tangible activity, for example, watching TV, shopping. 2. Interest(I): referring to the degree of excitement that people have about certain things or subjects, which can draw special and sustained attention from people. 3. Opinion(O): referring to the oral or written response given by individuals to the issues resulting from external stimulation. Furthermore, Plummer(1974) added demographic attributes to make a total of four dimensions. In constructing the scale, the primary dimensions shall be determined followed by the sub-dimensions under each primary dimension. Then, items shall be written to measure each sub-dimension. The number of sub-dimensions on each primary dimension depends on the nature of the research. Hawkins & Coney(2004) stated that the AIO scale can provide more reference information beyond demographical attributes; however, the scope of original AIO seems too narrow. Generally speaking, the existing psychological statistics or lifestyle research includes the following items:

1. Attitude: evaluation statement regarding people, place, ideas, and products, etc.

2. Set of values: various beliefs regarding what are acceptable versus what are not acceptable.

3. Activity and interest: the non-occupational behavior to which consumers devote time and effort, such as hobbies, sports, and community services.

4. Demographic attributes: such as age, sex, education, income, occupation, family structure, racial background, residence, and religion, etc.

5. Type of media: specific media used.

6. Frequency of usage: consumption amount of a specific product category, usually denoted by four levels of heavy, medium, light, and none.

Physical fitness and health-related physical fitness

The American Medical Association defined physical fitness as the most effective adaptation to physical body motions. The National Council on Physical Fitness and Sports of the Executive Yuan in Taiwan defined physical fitness as the capacity of the body that can safely and effectively respond to the challenges and burdens from daily life to avoid excessive fatigue and still have energy left for leisure and entertainment activities. Cordes & Ibrahim (1999) believed that physical fitness should not be judged by any single standard as the optimal state of physical fitness usually vary by age, gender, physical capacity, and overall health condition.

Health-related physical fitness refers to the functionality of heart, lung, blood vessels, and muscles that is closely related to health. Greenberg & Pargman (1986) defined health-related physical fitness as a person's working capacity and extra aptitude for leisure activities. In this research health-related physical fitness is defined as the physical capability that individuals have to enable heart, blood vessels, lung, and muscles to function effectively.

By the definition of National Council on Physical Fitness and Sports in Taiwan, one's health-related physical fitness can be measured from the following four aspects:

1. Body Composition: refers to body fat percentage. Human body is made up of fat and non-fat tissues. Maintaining an ideal weight is beneficial in terms of maintaining appropriate body composition. Excessive body fat tends to cause chronicle diseases like coronary heart disease, strike, high blood pressure, and diabetes.

2. Muscular Strength and Stamina: refers to the length of time or the times of repetition for which muscle groups can sustain contraction under maximum resistance. A person with great muscular strength and stamina can better handle daily physical activities and avoid muscle fatigue and soreness.

3. Flexibility: refers the reach of joints and the extension force of the ligament, and muscle surrounding joints. A person of great flexibility is in a better shape to prevent muscle or ligament injuries, or twist of joints in physical exercises.

4. Heart and Lung Stamina: refers to the ability of body to constantly inhale and utilize oxygen during physical exercises. A person with great heart and lung stamina can better deal with long-time physical exercises, and experience less fatigue, and are less likely to have cardiovascular diseases.

From many studies show that when the health-related lifestyle is favorable, leisure is likely to be more beneficial to health of the individual.(Toda et al,2007; Linda L. Caldwell,2005; Iwasaki Y et al,2001; Roberts K. et al,1989) The study will further explores the relationship between leisure lifestyle and health-related physical fitness for college student.

Materials and Methods

Instruments

Leisure lifestyles were measured using the Leisure lifestyle scales for college students. Leisure lifestyle scales for college students were developed based on prior leisure lifestyle researches conducted by Cheng & Liu(2001，2003) The primitive leisure lifestyle scales comprised 34 items and 6 constructs. Given that college students, as a subgroup of fellow citizen, may possess somewhat different leisure lifestyle than the fellow citizens as a whole, appropriate modifications were made to develop the leisure lifestyle scales for college students. The modified leisure lifestyle scales comprised 25 items and 5 construct. The name of the constructs and sample items are presented in Table 2.

Four aspects of students' health-related physical fitness are measured, and they are body composition, muscular strength & stamina, flexibility, and heart & lung stamina. Body composition is measured by body mass index (BMI) which equals to weight (kilogram) divided by height (meter) squared, i.e. (weight) / (height^2). Higher BMI indicates heavier weight. According to National Council on Physical Fitness and Sports research report(2003), BMI for Taiwan citizens in 2002 shall be interpreted using Table 1.

Table 1. Body mass index for Taiwan fellow citizen in 2002

Gender	Age	Underweight	Ideal weight	Overweight	Obese
Male	19~20	BMI < 18	$18 \leqq BMI < 26$	$26 \leqq BMI < 27$	$BMI \leqq 27$
	21~25	BMI < 19	$19 \leqq BMI < 26$	$26 \leqq BMI < 28$	$BMI \leqq 28$
Female	19~20	BMI < 18	$18 \leqq BMI < 23$	$23 \leqq BMI < 25$	$BMI \leqq 25$
	21~25	BMI < 18	$18 \leqq BMI < 23$	$23 \leqq BMI < 25$	$BMI \leqq 25$

Source: National Council on Physical Fitness and Sports, 2003 Physical Education Statistic. (Taipei: National Council on Physical Fitness and Sports)

Muscular strength & stamina is measured by number of hand-to-shoulder-sit-ups in 60 seconds (frequency count). Higher frequency indicates superior muscular strength & stamina. Flexibility is measured by the how close down to the floor one can bend his body under seating position. Longer distance in centimeter indicates superior flexibility. Heart & lung stamina is measured by physical strength index. Higher physical strength index indicates greater heart & lung stamina.

Procedure and sample

To investigate whether significant difference existed among students possessing different leisure lifestyles, three types of information are needed. First of all, students' health-related physical fitness data were excerpt from the 2002 Taiwan citizen's physical fitness test results. The 2002 Taiwan citizen's physical fitness test was one of the nation's projects to examine the physical fitness of Taiwan citizens. When the project was executed in November, 2002, Asia University as a newly-established university only have two years of students, as a results, all freshman and sophomore students from four schools and twelve departments were tested.

Secondly, the 2003 Leisure Lifestyles for College Students questionnaire was given out to collect the needed information regards students' leisure lifestyles (Part I) and demographic profile (Part II). Limited by the availability of data for not every student in Asia University took physical fitness test at the time of survey, our research population only included all students who had taken Taiwan citizen's physical fitness test in Nov. 2002. By purposive sampling, four sample departments, one department from each school, eight classes (one sophomore class and one junior class for each sample department), 300 students, were drawn from a total of seventeen departments, and 2,832 full-time students. Four sample departments were Department of Healthcare Administration in Collage of Health Science, Department of Applied Foreign Languages in College of Arts and Sciences, Department of Leisure and Recreation Management in College of Management, and Department of Information and Design in College of Computer Science.

The survey was conducted during the period from Jan.5, 2004 to Jan. 16, 2004. 241 valid questionnaires were obtained from a total of 300 leisure lifestyles questionnaires. The successful response rate was 80.3%. Although there is a time lag of about one year and two months for health-related physical fitness data and leisure lifestyle data because health-related physical fitness test was not conducted annually, the researchers considered the one-year-and-two-month lag would only make a minor impact on our research because one's physical fitness and leisure lifestyle usually remains fairly stable.

Results

The researchers first used item analyses for item selection and item validation. We removed items that were "hardly related to the construct at which it was aimed (low loading on the relevant factor and low item-scale correlation)" or items that were found to be measuring "more than one construct." Then, factor analyses (principle component) on twenty-two items followed by varimax rotation (orthogonal rotation) and reliability analyses resulted in four factors with an eigenvalue > 1.0. Four factors explain a total 57.06% of the variability in students' leisure lifestyle. These four factors were interpreted as "vacation loving," "sports loving," "dawn activity loving," and "healthy diet." The reliability (Cronbach's α) of leisure lifestyle, as presented in Table 2, is satisfactory (between 0.78 to 0.87) for all but the fourth factor, "healthy diet" (Cronbach's α = 0.57). Nevertheless, such results are sufficient for our research purposes because all Cronbach's α values are greater than 0.5 (Huang，2000). The Kaiser-Meyer-Olkin (KMO) value is 0.85 and the Bartlett's Test of Sphericity ($p < 0.001$) both support the factorability of the correlation matrix. Results of factor analyses are summarized in Table 2.

Table 2. Factors, items tested, Loading, Cronbach's α, eigenvalue, % variance explained for leisure lifestyle scales

Leisure lifestyle Domain & Items Tested		Cronbach's α	Eigenvalue	% variance
Factor 1: Vacation loving (8*)		0.86	6.56	29.83
1. I'd like to take trips on two-day-off weekends.	0.761			
2. I enjoy taking vacations.	0.742			
3. I spend a great deal of money on travels every year.	0.729			
4. I travel at least once every month.	0.735			
5. I can have more diverse leisure activities due to two-days-off policy.	0.675			
6. I travel more often after the implementation of two-day-off policy.	0.612			
7. I pay attention to travel-related news on medias.	0.604			
8. Whenever possible, I rather travel outside than stay home.	0.622			
Factor 2: Sports loving (7*)		0.87	2.66	12.07
9. I exercise on a regular basis.	0.771			
10. I enjoy sweating after exercises.	0.759			
11. I made quit a few friends through exercises.	0.754			
12. It made me feel uncomfortable if I don't exercises	0.752			

everyday.

13. I do stretching exercises at least three times per week.	**0.688**			
14. I do intense exercise for 20-30 minutes at least three times a week.	**0.649**			
15. I do leisure physical activities (e.g. stroll, swimming, playing soccer, biking).	**0.547**			
Factor 3: Dawn activity loving (4*)		0.78	1.80	8.17
16. I exercise in a park after getting up.	**0.803**			
17. I have a habit of doing morning exercises on a regular basis.	**0.773**			
18. Morning hours are my primary outdoor activity time.	**0.714**			
19. I like to chat with my pals when I do morning exercises.	**0.642**			
Factor 4: Healthy diet (3*)		0.57	1.54	6.99
20. I become more and more concerned with organic diet.	**0.623**			
21. I would not have cold drink during suppers.	**0.648**			
22. I am very concerned with the concepts of healthy diet.	**0.798**			
Total variance explained				57.06

Note: Number of items tested for a particular domain, KMO value is 0.85. Bartlett's Test is p＜0.001

Cluster analyses

Cluster analysis (K-means) was conducted, followed by factor analysis, based on factor scores to identify groups of students with similar leisure lifestyles. Two, three, and four cluster solutions were reviewed, and results showed that four groups, consisting 59, 51, 66 and 65 college students, respectively, appeared to be most coherent and interpretable. In order to discern the significant difference existed among four groups and to interpret the grouping, we conducted for each of the four factors an ANOVA and LSD tests. The results show that four groups differed significantly (p values < 0.001) in terms of their factor scores. The mean factor scores of four groups on four factors and the test results are given in Table 3.

The researchers name college students in cluster 1 as "dawn activity lovers" because they have highest scores on "dawn activity loving" (1.394), and low scores on the rest factors (close to zero). The researchers name students in cluster 2 as "sports lovers" because they exhibit a sports loving orientation (1.410). Students in cluster 3 can be interpreted as "indoor healthy dieters" because they score highest on "healthy diet" (0.458) and score low on rest three factors (all negative). The researchers name students in cluster 4 as "vacation lovers" because they exhibit a vocation loving orientation (0.764).

Table 3. One-way ANOVA analyses on five leisure lifestyle factors for four clusters: mean factor scores, F(N=241)

Domain	Cluster 1: Dawn activity lovers	Cluster 2: Sports lovers	Cluster 3: Indoor Healthy dieters	Cluster 4: Vacation lovers	F value	LSD test
Vacation loving	0.088	-0.016	-0.819	0.764	41.53***	4 > 1 > 3, 4 > 2 > 3
Sports loving	-0.009	1.410	-0.476	-0.615	112.31***	2 > 1 > 3, 2 > 1 > 4
Dawn activity loving	1.394	-0.422	-0.399	-0.529	137.76***	1 > 2, 1 > 3, 1 > 4
Healthy diet	0.193	-0.225	0.458	-0.464	12.42***	1 > 2, 1 > 4, 3 > 2, 3 > 4
N (% in total)	59 (24.5%)	51 (21.1%)	66 (27.4%)	65（27.0%）		

Note: Mean factor scores. * $p<0.05$; **$p<0.01$; ***$p<0.001$ (two-tailed).　All LSD test results were significant at the 0.05 level.

Difference between health-related physical fitness and leisure lifestyles

In order to detect whether significant difference existed in health-related physical fitness among students exhibiting various leisure lifestyles. One-way ANOVA analyses and LSD tests, if necessary, were conducted on four indexes of physical fitness for four groups of college students (Table 4).

Table 4. One-way ANOVA analyses and LSD tests on four health-related physical fitness indexes for four clusters: mean indexes, standard deviation, F(N=241)

Health-Related Physical Fitness Indexes	1.Dawn activity lovers	2.Sports lovers	3.Indoor healthy dieters	4.Vacation lovers	*F* value	LSD test
Body composition	21.26 (3.44)	21.93 (3.01)	20.08 (2.39)	20.25 (2.71)	5.25**	2 > 3, 2 > 4, 1 > 3
Muscular strength & stamina	34.25 (8.03)	37.82 (8.92)	31.61 (8.90)	32.35 (9.11)	5.59***	2 > 1, 2 > 3, 2 > 4
Flexibility	32.61 (8.16)	36.40 (6.65)	34.26 (10.04)	32.06 (9.15)	2.76*	2 > 1, 2 > 4
Heart & lung stamina	52.21	54.71 (7.94)	53.38 (9.01)	51.71(10.46)		-

	(11.59)			1.01
N (% in total)	59 (24.5%)	51 (21.1%)	66 (27.4%)	65（27.0%）

As can be seen from Table 4, significant *F* value for body composition (*F*=5.25) along with LSD test results, 2 > 3, 2 > 4, and 1 > 3, shows that although all four groups of college students have *ideal* weight, sports lovers tend to have higher body mass index than indoor healthy dieters and vocation lovers, and dawn activity lovers tend to have higher body mass index than indoor healthy dieters.　In other words, sports lovers are prone to have heavier weight than indoor healthy dieters and vocation lovers, and dawn activity lovers are inclined to have heavier weight than vacation lovers.

Next, significant *F* value for muscular strength & stamina (*F*=5.59) along with LSD test results, 2 > 1, 2 > 3, and 2 > 4, shows that the muscle groups of sports lovers usually can, when under maximum resistance, sustain longer contraction time, and, hence, achieve more repetition than dawn activity lovers, indoor healthy dieters, and vacation lovers.　In other words, sports lovers usually can better handle daily physical activities and avoid muscle fatigue and soreness than dawn activity lovers, indoor healthy dieters, and vocation lovers. Moreover, the researchers also found that no significant difference in muscular strength & stamina was found among dawn activity lovers, indoor healthy dieters and vocation lovers indicating that less intense sporting activities, usually done by dawn activity lovers, probably will not result in significant change in one's muscular strength & stamina.

Significant *F* value for flexibility (*F*=2.762) along with LSD test results, 2 > 1 and 2 > 4, shows that sports lovers usually can stretch their body out farther without hurting their muscle or joints than dawn activity lovers and vacation lovers. In other words, sports lovers usually are less likely to have shoulder pain, neck pain, and lower back pain resulted from improper posture than dawn activity lovers and vacation lovers. Insignificant *F* value for heart & lung stamina (*F*=1.012) shows that there is no much difference significantly enough to differentiate those four clusters of leisure lifestyle regarding to their heart &lung stamina. This can indicate that the heart &lung stamina is too complicated to explain by the differences of leisure lifestyle s.　In short, our research concludes that college students who engage in routine exercises tend to have heavier weight, superior muscular strength & stamina, and better flexibility than those who do not exercise on a regular basis.

In conclusion, in response to the first research question, the researchers identified four dimensions characterized leisure lifestyles of college students: "vacation loving,"

"sports loving," "dawn activity loving," and "healthy diet." In response to the second research question, based on students' leisure lifestyles, researchers divided college students into four groups: "dawn activity lovers," "sports lovers," "indoor healthy dieters," and "vacation lovers."

In response to the third research question, the researchers found that significant difference in health-related physical fitness existed among college students exhibiting different leisure lifestyles. Our results show that college students who engage in routine exercises tend to have heavier weight, superior muscular strength & stamina, and greater flexibility than those who do not exercise on a regular basis, for example, indoor healthy dieters and vocation lovers.

Discussion

This study of sophomore and junior students in Asia University demonstrates that, although there existed significant difference in body composition with which sports lovers tended to weight heavier than indoor healthy dieters and vocation lovers, and dawn activity lovers tended to weight heavier than indoor healthy dieters, the weight of all four groups of students are regarded as ideal weight. This result is expected because the majority of our samples (80.0%) were still very young (between 19-21), and in the prime time of their life. The researchers speculate that greater difference could emerge if the researchers would have used a full spectrum of samples to include those from very young to very old, those of the unemployed, blue-collar to white-collar workers, or if the researchers could conduct a longitudinal research by observing samples for a longer time span, say 20 or 30 years. Furthermore, it is unexpected to find that no significant difference in heart & lung stamina was existed among four groups of college students. With similar causes as above, the researchers speculate that significant difference in heart & lung stamina could emerge if researchers expand observations to include samples from all age groups. The study also shows that the proportion of sports lovers and dawn activities lovers, who tend to have superior physical fitness, are smaller than indoor healthy dieters and vacations lovers, who tend to have inferior physical fitness. If this trend persists, the researchers expect that the health-related physical fitness will be degraded even further in the future for college students in Taiwan. And the declining of sporting time, degrading of physical fitness, and increasing dissatisfaction about one's health condition will result in continuing increases in public health insurance expense.

Since college life is considered as a critical period in one's lifetime. The leisure activities in which college students participate, the health concept students absorb, and the exercise habit students form all have significant impacts on students' college life and work life after graduation. The researchers suggest that the design of physical

education courses in college and university can include those to improve students' health-related physical fitness based on the results of annual freshmen physical fitness examination. Based on our finding that female students are prone to have poorer health-related physical fitness than male students, the researchers suggest that a university can design some physical activities more applicable to female students in order to increase their interest in sports and to improve their physical fitness. Finally, the researchers suggest that a university can conduct more sports-related competitions. Through participating in these competitions, not only students' physical fitness can be improved, but they could also build stronger social network and strength their self-confidence.

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