2018-0903 IJOI
http://www.ijoi-online.org/

EFFECT OF MIDDLE AND OLD-AGED PEOPLE'S CONSTRAINT FACTORS WHEN USING SWIMMING POOLS IN PUBLIC UNIVERSITIES ON BEHAVIOR INTENTION

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Abstract

This study aims to explore the effect of middle and old-aged people's constraint factors when using swimming pools of public universities on behavior intention. It treated middle and old-aged users of swimming pools of public universities as subjects. By purposive sampling, it distributed questionnaires to 1200 subjects, and collected 1190 copies, with a return rate of 96%. After eliminating the invalid samples, there were 1179 valid samples, with a valid return rate of 95.8%. SPSS 20.0 was used for statistical analysis, including descriptive analysis of demographic variables and difference analysis of constraint factors of demographic variables. AMOS 20.0 was also used to explore the relationship among variables. The results showed that: 1) gender does not have a significant effect on constraint factors; 2) age does not have a significant effect on constraint factors; 3) residential place has a significant effect on constraint factors; 4) constraint factors show significantly negative effect on behavior intention.

Keywords: Swimming Pool of Public University, Constraint Factor, Behavior Intention

Introduction

Research Background and Motives

According to data of Department of Statistics, Ministry of the Interior 2017, Taiwan population aging index broke through 100 for the first time in February 2017 and the index was 100.18. It means that the elderly population overpassed young age population for the first time. Ministry of the Interior estimated that ratio of the elderly population in total population will be higher than 14% in 2018. In other words, Taiwan will become aged society. Based on previous data, population structure in Taiwan changes severally and issues related to seniors are gradually the concerns for the public. The concept "protection for the old age" becomes critical in governmental policy, such as construction of

long-term care system or subsidized project of Department of Social Welfare, Taipei City Government 2015 to the elderly activity bases. The purpose of the project was to expand small-scale elderly activity bases in communities by subsidy to related groups. It encouraged the elderly to use the activity bases in the neighborhood at leisure time to practice recreational activities which enhance physical and mental health. Besides, it satisfied activity demand after the increase of aged population and strengthened the seniors' social participation (Taipei City Government, 2015).

In addition, according to investigation on sports cities by Sports Administration, Ministry of Education (2017) in 2015, as to average weekly exercise frequency, "above 70 years old" (5.63 times) was the first and the second was 65-69 years old (5.06 times). It shows that with sufficient time and competence, the seniors seized the opportunities to practice sports. As to sports practiced the most by people in Taiwan, percentage of "walking" (42.4%) was the highest and the second was "jogging". "Swimming" was 7.6% and it was Top 7 (Sports Administration, Ministry of Education, 2017). Public swimming pools play important roles in the promotion of swimming in Taiwan. Swimming pools of public universities or different counties and cities provide places for the public to practice swimming. Although main subjects of swimming pools in public universities are students and the faculty, in order to expand sources of management funds, swimming pools in some schools are accessible to community people. The elderly thus have more opportunities to approach swimming.

However, with physical and psychological change, seniors have more concerns when participating in sports. Their physical functions are aged and besides, due to various chronic diseases, physical and mental functions successively decline and it changes the frequency of their sports participation. According to Yeh's (2015) perspective, in terms of leisure constraints theory, the seniors encounter complicated leisure constraint factors. For instance, after retirement, they still have financial burden and are not interested in recreation. They avoid going out due to factors of health. They are widowed or live alone without companies. They lack appropriate leisure facility and environment. These factors might lower seniors' recreational opportunities to release life stress. They thus cannot enjoy life after retirement. Therefore, it shows the effects of different constraint factors on seniors' sports participation. Exploration on effect of middle and old-aged people's constraint factors when using swimming pools of public universities on behavior intention becomes one of the keys in this study.

According to past related literatures, the studies on leisure sports regarding seniors' constraints of use were rare. Most of research elaborated the statements from perspectives of leisure constraints or sports constraints (Wu, Tsai, Chang, 2011; Lin, Wu, 2012; Tsai, Lu, and Wu, 2015), few were based on perspectives of sociology. For instance, Yeh (2015) reviewed national and foreign literatures and explained the theoretical implication of leisure constraints and recreational environment. Besides, from perspective of leisure sociology, the said researcher elaborated relationship between the seniors' individual recreation and overall recreational environment. In addition, Chang and Huang (2015) fo-

cused on the center for seniors as research scope to explore determinants of seniors' sports behavior stage and their sports constraints. In other words, constraints (such as software and hardware facility) of middle and old-aged people's use of public swimming pools were rarely mentioned. Effects of these constraints of use on middle and old-aged people's behavior intention to participate in swimming become the keys explored by this study.

Literature Review

The concept of constraint was first proposed by Lewin in 1951 in order to interpret concept of constraints from perspective of social psychology. The said researcher argued that constraints mean various suppression when individuals' behavior is restricted by internal and external environments. Subsequently, concept of constraint was successively applied to fields related to recreational sports. For instance, Tseng (2006) stated that studies related to leisure constraints could be traced back to early 1960. At the beginning, the terms "barriers" were adopted and they referred to single type of constraints. Currently, most of the researchers adopt the terms "constraints" which mean all variables intervening individuals' activities preferred and participation. Jackson and Searle (1985) suggested that when people have intention to participate in one activity, but one or at least one constraints influence their intention, it is called leisure constraint. Said people include those who do not have recreational interest and do not participate in the activities. In addition, constraints are classified into internal and external ones. Crawford and Godbey (1987) further elaborated effect of leisure constraints on people's participation in activities and argued that when individuals have recreational preference and due to intervention of leisure constraints, the preference cannot be practiced. In other words, individuals' perceived dislike or refusal of participation influences their absence or lower and change the motive to participate in leisure activities. Individuals' interest in leisure activities is influenced by many factors.

Absolute constraints of participation or reduction of leisure preference, interest, motive and participation frequency are regarded as constraints. Hence, factors of leisure constraints are various. Crawford and Godbey (1987) further generalized factors of leisure constraints into the following: 1) individuals' internal constraints mean individuals' leisure participation or preference is influenced by internal mental state or preference, such as frustration, pressure, religion, perceived self- competence and subjective evaluation on leisure activities. 2) interpersonal constraints: it means individuals' leisure preference and continuity of participation are influenced by interpersonal relationship or lack of appropriate or sufficient leisure partners. 3) Structural constraints: it means external factors which influence individuals' leisure preference or participation, including time, knowledge, economy, facility, climate, transportation, family, etc. With the change of leisure participants' consumption habit and special demand from specific groups when participating in leisure sports, concept of constraints refers to research subjects. Using this study as an example, at present, some swimming pools of public universities provide more and more self-service technology. For instance, members' cards are based on

contact IC cards. Although it is more convenient channel for participants, some middle and old-aged people complain since they are not familiar with application process or they lack the knowledge and competence to use IC cards technology. Nevertheless, factors which cause constraints of use are various and they can include individuals' mental stage, interpersonal communication and even external factors. It is one of the key points explored by this study.

The concept of behavior intention is based on Ajzen's Theory of Planned Behavior. Ajzen (1985) argued that Theory of Planned Behavior can effectively elaborate and predict intention or behavior. It assumes that three predictors, attitude, subjective norm and perceived behavioral control, influence each other. Intention is affected by different degrees of attitude, subjective norm and perceived behavioral control. Rivis and Sheeran (2003) validated the mutual effect among three predictors. According to their meta analysis on past research (1993-2001) regarding TPB, correlation between attitude and behavior was relatively high. Although correlation between social norm and behavior was not as significant as that between attitude and behavior, it showed medium positive correlation.

Furthermore, the Theory of Planned Behavior assumes that when individuals have more positive attitude toward certain behavior, they perceive more social pressure in the surrounding. When their actual control to recognize the behavior is higher, their intention to adopt the behavior is more significant. For instance, when middle and old-aged people have positive view toward swimming, they are more likely to participate in swimming. In addition, when middle and old-aged participate in swimming with the support of partners or their family members actively encourage their participation, they are more likely to participate in swimming. Finally, when middle and old-aged people have sufficient physical strength, technique and related knowledge of swimming, their intention to participate in swimming will be higher. Thus, it shows the feasibility to apply behavior intention to practical management. According to Lin, Hsu, Yang, and Fang (2016), behavior intention is only the predisposing factor of actual behavioral performance. From perspective of marketing management, it is critical to recognize predisposing factor of consumers' decision making and it can be more important than actual behavior.

According to related literatures, it lacks the research on effect of constraints of use on behavior intention. Liu (2009) treated the minority as subjects and demonstrated that leisure constraints significantly and negatively influenced the minority's participation in leisure behavior. Transportation and expense were the major problems; Hung (2015) treated biking participants as subjects and realized that there was significantly positive correlation between biking participants' behavior intention and leisure constraints. Previous studies showed the relationship between constraints to participate in activities and behavior intention. Therefore, this study treats middle and old-aged people of swimming pools of public universities as subjects and further explores effect of constraint factors of use on behavior intention. The final suggestions can serve as reference for middle and old-aged people or related units.

Research Method

Research Structure

According to construction of theoretical framework and deduction of hypotheses, this study develops research framework, as shown in Figure 1.

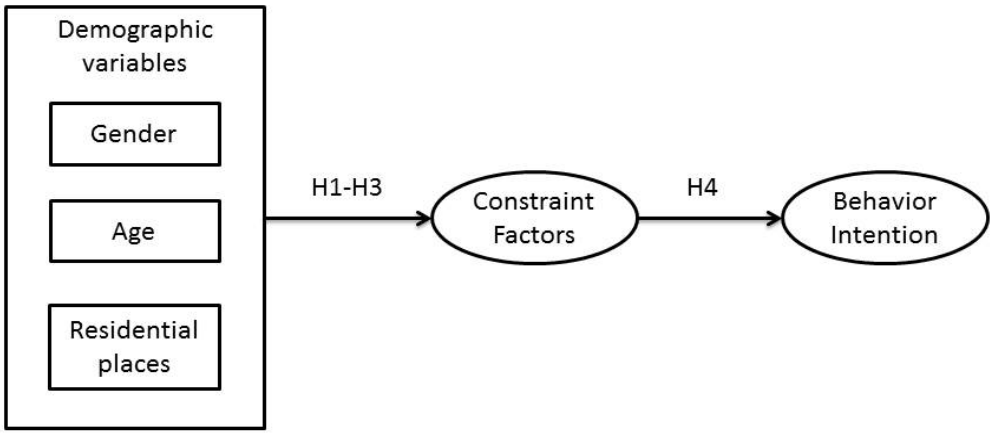


Figure 1. Research framework

Research Hypotheses

According to related literature review and purposes and research framework of this study, the researcher proposes the following hypotheses:

H1: Different genders show significant difference on constraint factors

H2: Different ages show significant difference on constraint factors

H3: Different residential places show significant difference on constraint factors

H4: Constraint factors significantly influence behavior intention.

Research Subjects and Tools

Research subjects

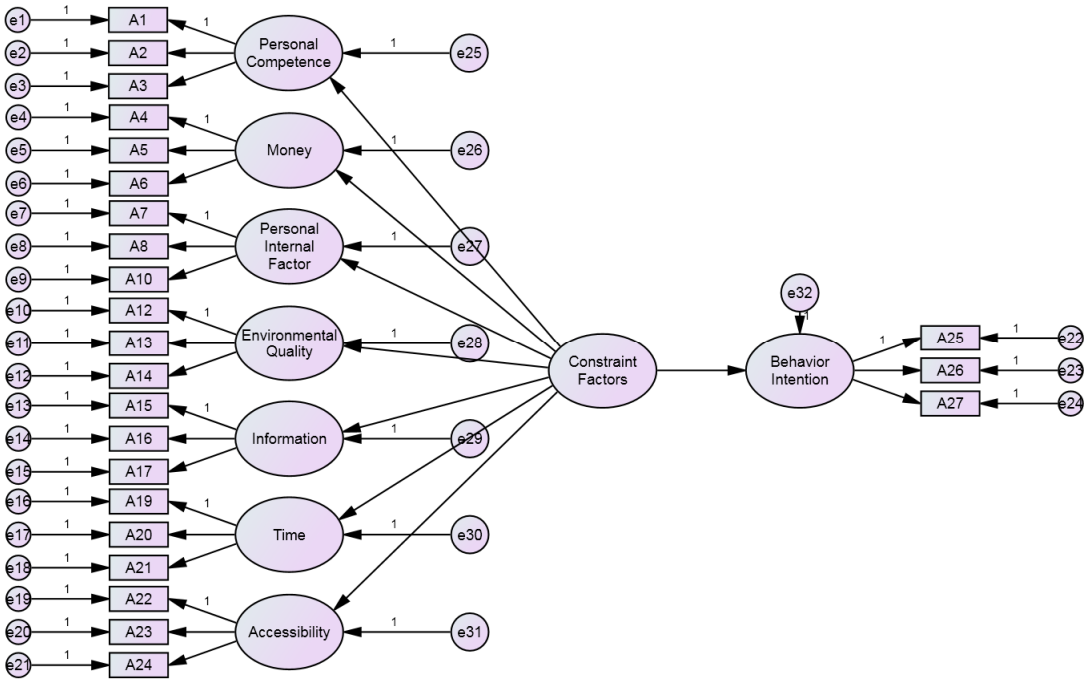
This study aimed to explore effect of middle and old-aged people's constraint factors to use swimming pools of public universities on behavior intention. It treated middle and old-aged users of swimming pools of public universities as subjects. By purposive sampling, it adopted 1200 subjects as samples for questionnaire survey. It retrieved a total of 1190 questionnaires. Return rate was 96%; there are 1179 valid questionnaires. Valid questionnaire rate was 95.8%.

Research Tools

Design of scale

Scale of middle and old-aged people's constraint factors to use swimming pools of public universities was mainly based on literatures of Raymore, L., Godbey, G., Crawford, D., and Von Eye, A. (1993) and it was designed according to data of open-ended questionnaires of this study. There are

24 items in the scale and it includes 7 dimensions, “personal competence”, “money”, “personal internal factor”, “environmental quality”, “time”, “accessibility” and “information”. Scale of behavior intention was based on research of Lin (2006) and Lo (2007) and was revised according to this study. Questionnaire survey relied on Likert 5-point scale. According to subject’s degrees of perception, it refers to “Strongly disagree”, “Disagree ”, “Fair”, “Agree”, and “Strongly agree” and the scores are 1, 2, 3, 4 and 5. (See Figure 2.)



Personal competence Money Personal internal factors Environmental quality Information Time Accessibility Constraint Factors Behavior Intention

Figure 2. Research model

Data Processing and Analysis

By statistical program SPSS 20.0, this study archived the retrieved valid questionnaires and conducted difference analysis of demographic variables on constraint factors. By statistical program AMOS 20.0, it analyzed relationship among variables.

Research Results

Characteristics of Samples

By descriptive statistics, this study recognizes distribution of basic information and generalizes data analysis, as shown in Table 1. Among 1179 valid samples, as to gender, there are 593 males and they are 50.3% among valid samples; there are 586 females and percentage is 49.7%. Most of subjects are males. As to age, most of them are 51-55 years old and they

are 33.2% in valid samples. The least are above 71 years old and percentage is 1.2%. As to residential places, most of them live in northern Taiwan and percentage is 53.5% in valid samples; eastern Taiwan is the last and percentage is 12.6%. It shows that most of subjects are in northern Taiwan.

Table 1. Characteristics of samples

Variable	Category	Frequency	Percentage%	Cumulative Percentage%
Gender	Male	593	50.3	50.3
	Female	586	49.7	100.0
Age	46-50 (including) years old	350	29.7	29.7
	51-55 (including) years old	392	33.2	62.9
	56-60 (including) years old	261	22.1	85.1
	61-65 (including) years old	128	10.9	95.9
	66-70 (including) years old	34	2.9	98.8
	Above (including) 71	14	1.2	100.0
Residential places	Northern Taiwan	631	53.5	53.5
	Central Taiwan	217	18.4	71.9
	Southern Taiwan	183	15.5	87.4
	Eastern Taiwan	148	12.6	100.0

Difference Analysis of Constraint Factors of Different Demographic Variables

Difference of middle and old-aged people with different genders on constraint factors

This study validates H1 by independent sample t-test and the result shows that p value is 0.000 and it is lower than 0.05. Test result is significant. It means that middle and old-aged people's different genders show significant difference on constraint factors, as shown in Table 2.

Table 2. t test analysis of different genders on constraint factors

Dimension factors	Gender	*N*	*M*	Standard deviation	*T value*	*P value*
Constraint factors	Male	593	3.00	.489	3.501	0.000
	Female	586	3.10	.488		

***P<.001, **P<.01, *P<.05
Source: Compiled by this study.

Difference of middle and old-aged people's different ages on constraint factors

This study tests H2 by One-Way ANOVA and the result shows that p value is 0.187 and it is higher than 0.05. Test result is insignificant. It means that middle and old-aged people's different ages do not show significant difference on constraint factor, as shown in Table 3.

Table 3. One-Way ANOVA of different ages on constraint factors

Dimension factors	**Gender**	***N***	***M***	**Standard deviation**	***F value***	***P value***
Constraint factors	46-50 (including) years old	350	3.042	.500	1.545	0.187
	51-55 (including) years old	392	3.037	.469		
	56-60 (including) years old	261	3.055	.465		
	61-65 (including) years old	128	3.102	.502		
	66-70 (including) years old	48	3.202	.669		

****P*<.001, ***P*<.01, **P*<.05

Difference of middle and old-aged people's different residential places on constraint factors

This study tests H3 by One-Way ANOVA. According to the result, p value is 0.000 and it is lower than 0.05. Test result is significant. It means that middle and old-aged people's different residential places show significant difference on constraint factors. It further conducts Scheffe's Method to test the analytical result, as shown in Table 4.

Table 4. One-Way ANOVA of different residential places on constraint factors

Dimension factors	**Residential places**	***N***	***M***	**Standard deviation**	***F value***	***P value***	**Scheffe**
Constraint factors	Northern Taiwan	631	2.977	.510	15.368*	0.000	4>1 3>1 4>2
	Central Taiwan	217	3.077	.379			
	Southern Taiwan	183	3.170	.533			
	Eastern Taiwan	148	3.226	.425			

****P*<.001, ***P*<.01, **P*<.05

Measurement and Structural Model Analysis

Validation of convergent validity.

This study conducts CFA on scales of constraint factors of use and behavior intention of middle and old-aged people in swimming pools of public universities. Loading of all dimensions are 0.60~0.94; composite reliability are 0.81~0.87. Average Variance Extracted are 0.59~0.67. It means scales of constraint factors of use and behavior intention of middle and old-aged people in swimming pools of public universities show convergent validity. It matches test standard suggested by Hair, Anderson, Tatham and Black(1998), as shown in Tables 5 and 6.

Table 5. Validation analysis of scale of constraint factors

Dimensions	**Index**	**Standardized loading**	**Non-standardized loading**	**S.E.**	**C.R. (t-value)**	**P**	**SMC**	**C.R.**	**AVE**
Personal competence	A1	0.60	1.00				0.36	0.81	0.59
	A2	0.90	1.29	0.06	20.50	***	0.81		
	A3	0.78	1.10	0.06	19.61	***	0.60		
Money	A5	0.89	1.00				0.79	0.83	0.63
	A4	0.60	0.67	0.03	21.25	***	0.36		
	A6	0.86	1.01	0.03	31.52	***	0.74		
Personal internal factor	A8	0.82	1.00				0.67	0.84	0.64
	A7	0.75	0.84	0.03	26.00	***	0.56		
	A10	0.83	1.03	0.04	28.23	***	0.69		
Environmental quality	A12	0.75	1.00				0.56	0.84	0.63
	A13	0.81	1.10	0.04	25.25	***	0.66		
	A14	0.82	1.11	0.04	25.20	***	0.67		
Information	A16	0.90	1.00				0.81	0.87	0.69
	A15	0.68	0.82	0.03	26.07	***	0.46		
	A17	0.89	1.05	0.03	37.19	***	0.80		
Time	A19	0.78	1.00				0.60	0.83	0.62
	A20	0.88	1.12	0.04	27.34	***	0.78		
	A21	0.70	0.87	0.04	23..40	***	0.50		
Accessibility	A23	0.77	1.00				0.59	0.82	0.61
	A22	0.69	0.89	0.04	22.34	***	0.48		
	A24	0.87	1.07	0.04	26.55	***	0.75		

Table 6. Validation analysis of scale of behavior intention

Dimensions	Index	Standardized loading	Non-standardized loading	S.E.	C.R. (t-value)	P	SMC	C.R.	AVE
Behavior intention	A26	0.94	1.00				0.89	0.86	0.67
	A27	0.84	0.94	0.03	30.19	***	0.71		
	A25	0.65	0.71	0.03	23.50	***	0.42		

Validation of discriminant validity.

According to confidence interval of Bootstrap correlation coefficient 95% in scale of constraint factors of use of middle and old-aged people in swimming pools of public universities, this study does not recognize correlation coefficient which does not include 1. Hence, in this study, "personal competence", "money", "personal internal factor", "environmental quality, "time", "accessibility" and "information" of scale of constraint factors of use of middle and old-aged people in swimming pools of public universities reveal discriminant validity (Wu Ming-long, 2009), as show in Table 7.

Table 7. Confidence interval of Bootstrap correlation coefficient 95% of scale of constraint factors

Parameters				Estimates	Bias-corrected		Percentile method	
					Lower limit	Upper limit	Lower limit	Upper limit
Personal competence		<-->	Money	0.30	0.22	0.37	0.22	0.37
Personal competence		<-->	Personal internal factor	0.55	0.49	0.61	0.49	0.61
Personal competence		<-->	Environmental quality	0.20	0.13	0.28	0.12	0.27
Personal competence		<-->	Accessibility	0.27	0.19	0.34	0.20	0.34
Personal competence		<-->	Information	0.17	0.09	0.24	0.09	0.24
Personal competence		<-->	Time	0.25	0.18	0.32	0.18	0.32
Money		<-->	Personal internal factor	0.17	0.10	0.26	0.09	0.25
Money		<-->	Environmental quality	0.21	0.13	0.29	0.13	0.29
Money		<-->	Accessibility	0.43	0.36	0.50	0.36	0.50
Money		<-->	Information	-0.02	-0.09	0.06	-0.09	0.06
Money		<-->	Time	0.21	0.14	0.29	0.14	0.29
Personal factor	internal	<-->	Environmental quality	0.22	0.14	0.29	0.14	0.29
Personal factor	internal	<-->	Accessibility	0.25	0.18	0.32	0.18	0.33

Personal internal factor	<-->	Information	0.34	0.27	0.40	0.27	0.41
Personal internal factor	<-->	Time	0.36	0.28	0.43	0.29	0.44
Environmental quality	<-->	Accessibility	0.30	0.22	0.37	0.23	0.37
quality	<-->	Information	0.32	0.24	0.40	0.24	0.40
quality	<-->	Time	0.18	0.11	0.25	0.11	0.25
Information	<-->	Accessibility	0.22	0.14	0.29	0.14	0.30
Time	<-->	Accessibility	0.35	0.27	0.42	0.28	0.43
Information	<-->	Time	0.09	0.00	0.15	0.00	0.16

Structural Model Analysis

This study tests model fit by $\chi 2$ and ratio of degree of freedom. The ratio should be lower than 3. This study modifies ratio between model $\chi 2$ and degree of freedom >3(6.41); as to model of this study, GFI and AGFI are 0.93 and 0.91. It matches the suggestion of Chen Shun-Yu (2007)that GFI should be higher than 0.90 and AGFI should be higher than 0.80; as to model fit analysis, RMSEA should be 0.05~ 0.08. RMSEA is 0.07 and it means the model is good with reasonable fitness; finally, CFI is 0.93 and NFI is 0.92. It matches standard of model fit analysis (Wu Ming-long, 2009; Hair et al.1998). Generally speaking, fit indices match the standard. It shows that the model is acceptable, as shown in Table 8.

Table 8. Analysis of model fit

Fit Indices	**Acceptable scope**	**Adjusted model**	**Judgment of model fit**
$\div^2$ (Chi-square)	The smaller the better	2219.92	
$\div^2$ and ratio of degree of freedom	<3	9.10	Acceptable
GFI	>0.90	0.84	Fitted
AGFI	>0.80	0.80	Fitted
RMSEA	<0.08	0.08	Fitted
CFI	>0.90	0.90	Fitted
NFI	>0.90	0.90	Fitted

Validation of hypotheses.

H1 is not supported. Different genders do not show significant difference on constraint factors. The result is not consistent with finding of Huang (2003). The possible reason can be in that middle and old-aged people are at the age with declination of all. Thus, both genders encounter the same constraints of use. H2 is not supported. Different ages do not show significant difference on constraint factors. The result is different from that of Lin (2002). The possible reason can be in that when middle and old-aged people

of different ages have swimming habit, they can be engaged and they encounter the same constraints of use. H3 is supported. Different residential places show significant difference on constraint factors. The result matches research of Chen (2004). In addition, after post hoc comparison, this study realizes that group of eastern Taiwan is more significant than northern Taiwan. Southern Taiwan is more significant than northern Taiwan and eastern Taiwan is more significant than central Taiwan. The reason can be in that in metropolitan areas of northern and central Taiwan, there are more users of swimming pools of public universities and it indirectly lowers middle and old-aged people's participation in swimming. H4 is supported. In other words, constraint factors show significantly negative effect on behavior intention. The finding matches research of Liu (2009). The reason can be in that when middle and old-aged people and their relatives and friends have positive attitude toward their participation in swimming and they have swimming skills, after lowering related constraint factors, they will have higher intention to participation in swimming, as shown in Table 9.

Table 9. Validation result of hypotheses

Hypotheses	Path relationship	Path value	Hypothesis supported
4	Constraint factors->behavior intention	-0.08	Yes

Conclusion and Suggestions

Conclusion

With national sports trend established by "the Sports Island Establishment Project" in Taiwan, "national sports promotion project from 2016 to 2021" also emphasized "spontaneous, LOHAS and loving sports". "Spontaneous" means to enhance people's spontaneous and autonomic regular sports habit; "LOHAS" aims to combine sports with life and culture and develop local featured sports to allow the public to understand and recognize local featured sports culture; "loving sports" means to cultivate the public's sports interest. Thus, people in Taiwan exercise for the love of sports instead of for personal health (Sports Administration, Ministry of Education, 2015). Based on this policy, in the future, sports population of different ages and related sports places will successively increase. After approaching another stage of life, middle and old-aged people will certainly have more leisure time for sports. Swimming is one of the appropriate sports items for seniors in the conditions of physical strength and skill.

This study explores middle and old-aged people's constraint factors in swimming of public universities and effect on behavior intention. After empirical data analysis, this study obtains the following conclusions:

H1 is not supported. Different genders do not show significant difference on constraint factors.

H2 is not supported. Different ages do not show significant difference on constraint factors.

H3 is supported. Different residential places show significant difference on constraint factors. After post hoc comparison, group of eastern Taiwan is more significant than northern Taiwan. Southern Taiwan is more significant than northern Taiwan and eastern Taiwan is more significant than central Taiwan.

H4 is supported. Constraint factors show significantly negative effect on behavior intention.

Suggestions

For middle and old-aged swimming participants.

According to research findings, constraint factors negatively influence behavior intention. Thus, it is suggested that middle and old-aged swimming participants can lower constraints from all dimensions. As to personal internal constraints, using morning swimming as an example, they must clearly recognize their physical state to adapt to temperature change in the morning and physical reaction after swimming in the water. It is the perception and evaluation of personal competence. When they are competent, they can be engaged in morning swimming and develop positive image on the exercise. As to interpersonal constraints, it is suggested that they can construct the community with swimming companions to exchange and assist with each other. For instance, they can join in morning swimming community or groups established by swimming lovers.

Since middle and old-aged people cannot control physical states, they can obtain necessary support in the activity from these communities to avoid the loneliness when joining in swimming alone. They can maintain the passion in swimming. Furthermore, as to structural constraints, it is suggested that they can recognize the expense to join in swimming pools of public universities, transport time and software and hardware. They can even compare it with private swimming pools in the neighborhood to select the appropriate swimming place. As mentioned previously, some swimming pools of public universities successively introduce the management by new technology. Therefore, it is suggested that in order to lower constraints of use, middle and old-aged people can actively learn the use of related technology, such as application process or limitation of IC cards designed for members. Previous measures can avoid middle and old-aged people's constraints of use when using swimming pools of public universities, enhance their intention to participate in swimming and result in positive perception of swimming.

For managers of swimming pools of public universities.

This study shows that different residential places reveal significant difference on constraint factors. In metropolitan areas, constraint factors are higher than other areas. Therefore, it is suggested that managers of swimming pools of public universities in metropolitan areas can control the number of swimmers. Besides, it is

feasible to provide membership discounts for morning swimming groups of annually at least 50 members.

Morning swimming groups are mostly middle and old-aged people and the majority are retired. Reduction of group expense not only allows to properly use the off-peak periods of swimming pools, but also constructs positive interaction between schools and communities. It indirectly enhances positive image of public universities. In addition, for managers of swimming pools of public universities which are not in metropolitan areas, middle and old-aged people's constraints of use are lower. However, in order to maintain middle and old-aged people's passion in participation, it is suggested that billboards of swimming pools can be posted with information of related activities. Hence, middle and old-aged people can recognize current activities held by swimming pools and they can schedule their time to participate in certain type of competition or activity. In addition, by latest news and message boards on web pages of schools, middle and old-aged people can have more opportunities to learn swimming information. The schools can also establish communication platforms for the problems encountered to reduce their constraints of use.

Future research

This study treats swimming pools of public universities as research scope to explore effect of middle and old-aged people's constraints of use on behavior intention. It not only expands research issues related to seniors, but also provides base for future research regarding rare study on effect of seniors' constraints of use on behavior intention. It is the theoretical contribution of this study.

As to practical contribution, since swimming pools of public universities in Taiwan encounter different operational difficulties, this study not only avoids the research only from perspective of suppliers, but also provides practical suggestions for consumers' needs. This study recognizes seniors' needs and constraints of use and it can serve as reference for future operation and management of swimming pools of public universities. As to future research, this study only treats swimming pools of public universities as research scope. At present, some swimming pools of private universities, in order to expand financial sources, not only re-plan campus swimming pools, but also provide more diverse services and facilities. Future researchers can explore the effects of these operational models different from swimming pools of public universities on seniors' behavior intention.

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