

RESEARCH ON PUBLIC SWIMMING POOL MEMBERS' SPORTS BEHAVIOR MODEL OF SWIMMING: USING SPORTS HABIT AS A MODERATOR VARIABLE

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Abstract

This study aims to probe into swimming sports behavior model of members of swimming pools of public universities. Research subjects are the members of swimming pools. By convenience sampling, it treats 680 members as samples. It retrieves a total of 670 questionnaires and return rate is 98.5%; there are 650 valid questionnaires and valid questionnaire rate is 97%. Statistical analysis of data is based on statistical programs SPSS20.0 and AMOS20.0. According to research findings:

- 1) subjective norm significantly influences behavioral intention;
 - 2) attitude significantly influences behavioral intention;
 - 3) perceived behavioral control significantly influences behavioral intention;
 - 4) behavioral intention significantly influences behavior;
 - 5) AUT of habit shows moderating effect between behavioral intention and behavior;
 - 6) NEG of habit shows moderating effect between behavioral intention and behavior;
 - 7) PA of habit shows moderating effect between behavioral intention and behavior;
 - 8) SUB of habit shows moderating effect between behavioral intention and behavior.
- Finally, according to findings, this study proposes suggestions as reference for the following research.

Keywords - Swimming pool of public university, sports behavior model,
sports habit

Introduction

According to 2015 survey on sports cities of Sports Administration, Ministry of Education (2015), among the most common sports items practiced by people, swimming was 7.6%.

In addition, the data showed that for those who did not exercise in daily time, walking was the most practiced sport and the second was swimming. Thus, for people in Taiwan, swimming is popular and easy sport. In addition, according to sports statistics of 2016 of

Sports Administration, Ministry of Education (2016), from 1998 to 2015, among the subsidized constructed (re-constructed) sports facilities, there were 108 swimming pools of townships, cities and districts. Public swimming pools have been playing critical roles in promotion of swimming and development of national sports. The applicants to use swimming pools, after paying the charges of use, water and electricity, can swim in proper environment and pursue personal sports effects. However, with positive sports infrastructure, construction of sports behavior is a more important issue. For instance, in recent years, the craze of running competitions attracts the groups who rarely practice exercises. Nevertheless, with expensive registration fee and unstable quality of competitions, running is no longer popular. Likewise, Kuo (2017) stated that in 2016, there were 703 running competitions in Taiwan and, in comparison to 632 competitions in 2015, it was increased by 70. According to data, it seems that the numbers of competition became stable. In the previous year, running competitions has already been less popular. However, many people have developed running habit. Although swimming competitions are not as numerous as running, study on swimming participants' sports behavior model helps people recognize the essence of swimming and the role of sports habit in swimming. According to related literatures, general statements on sports behavior were mostly based on Trans-theoretical Model proposed by Prochaska and DiClemente in 1983 (Marshall & Biddle, 2001; Dishman, Vandenberg, Motl & Nigg, 2010; Johnson, Fallon, Harris & Burton, 2013; Alex-

andris, Du, Funk & Theodorakis, 2016). The model emphasizes that change of healthy behavior is a kind of dynamic process instead of "0% or 100%". Construction of one new behavior is based on five different phases: pre-intention period, intention period, preparation period, action period and duration period. At different phases, there are different methods and strategies in order to develop and establish new behavior (Lin, 2012). However, Huang and Chi (2003) argued that application of Trans - theoretical Model in change of sports behavior was generally effective; however, there was limitation. In other words, study on sports behavior is not only from the perspective of psychology. The Theory of Planned Behavior based on social psychology was proposed by Ajzen in 1985 and it argued that "behavioral intention" reflects individuals' intention to practice certain "behavior" and it is the best index to predict behavior. It consists of three dimensions: attitude toward the behavior, subjective norm and perceived behavioral control.

According to related literatures, the Theory of Planned Behavior was adopted by different researchers to measure individuals' perceived obstacles or factors of sports participation (Bang & Lee, 2014; Moyer, Pokrywczynski & Griffin, 2015; Song & Park, 2015). This study also constructs sports behavior of swimming by the said theory. In addition, although people's intention to practice certain sports can be explored by The Theory of Planned Behavior, some people's exercises are not based on rational perspective. For instance, it is common that people swim in the morning and it is

simply their habit. Wood and Neal (2007) shared the same view and stated that people's some behavior is associated with personal habit. In addition, The Theory of Planned Behavior cannot explain the possible different changes in the development of regular exercises (Godin, Valois & Lepage, 1993). Hence, Conner and Armitage (1998) suggested including the concept of habit in the framework of The Theory of Planned Behavior. Therefore, in order to construct more complete sports behavior model, besides The Theory of Planned Behavior, this study will adopt sports habit as moderator variable for research.

Literature Review

Regarding individuals' intention to practice certain behavior, behavioral intention is one of the common indices to predict behavior. Ajzen (1985) argued that The Theory of Planned Behavior can be applied to predict human beings' behavioral intention. The Theory of Planned Behavior is derived from Theory of Reasoned Action proposed by Fishbein and Ajzen in 1975. The basic assumption of the said theory is below: human beings' behavior is rational and they can fully control their behavior by personal will. However, in real environment, not all of the behaviors can be controlled by personal will. They are influenced by external objective environment or resource limitation. As suggested by Ajzen and Madden (1986), internal and external factors, such as individual difference, information, technique, competence, will, emotion, compulsion, neglect, time, opportunity and dependency on others, influence

individuals' control of behavioral intention.

In other words, there are various factors of people's practice of certain behavior. In order to supplement model of Reasoned Action and enhance explained power on individuals' practice of certain behavior, after integrating literatures related to social psychology, Ajzen (1985) included "perceived behavioral control" in model of Reasoned Action. Hence, The Theory of Planned Behavior can more effectively predict people's behavior. Ajzen suggested that human behavior depends on behavioral belief, normative belief and control belief. Among others, behavioral belief is individuals' evaluation on behavior and behavioral result. Behavioral belief is the attitude of preference. For instance, when swimming participants can obtain excellent experience or sports benefit in the process, they tend to have positive attitude toward swimming. Normative belief is derived from identification with others' encouragement or social pressure and it results in subjective norm. For instance, when swimming participants can participate in swimming communities or are supported by relatives and friends, their participation in swimming will be more active. Control belief refers to factors to enhance or hinder behavior of individuals. It includes resource and opportunity required to practice the behavior and the concern of convenience. Control belief leads to perceived behavioral control.

For example, when swimming participants can lower the constraints of participation or enhance their swimming skills, they are more likely to engage in swimming. Related litera-

tures show the possibility of application of The Theory of Planned Behavior in swimming. For instance, Irwin, O'Callaghan and Glendon (2017) combined The Theory of Planned Behavior with past behavior, parents' motivation of health pursuit, constraints and benefits in order to explore parents' behavioral intention to send their children to swimming classes. By The Theory of Planned Behavior, Hamilton, White, Wihardjo and Hyde (2015) explored sea swimmers' behavioral intention of safe behavior to avoid drowning. Through the said theory, Hamilton and Schmidt (2013) probed into male swimmers' behavioral intention to swim after drinking in order to avoid drowning. However, there is limitation in The Theory of Planned Behavior. For instance, Perugini and Bagozzi (2001) proposed MGB (Model of Goal-Directed Behaviour) model and the purpose was to expand and reinforce The Theory of Planned Behavior. MGB not only maintains dimensions of The Theory of Planned Behavior, but also includes factors such as expected emotion and past behavior. In other words, The Theory of Planned Behavior does not concern about human beings' habit transformed from past repetitive behavior (Aarts & Dijksterhuis, 2000). Hence, effect of sports habit on behavioral intention becomes another focus of this study.

Ko (2005) stated that "habit" refers to phenomenon including stimulus, reaction and stable connection of the two. In short, the phenomenon which lacks one of the previous factors does not refer to habit. For instance, one works with night shift for long term and after the work in the morning, he (she) swims before returning home.

However, when he (she) works in day shift, he (she) no longer has the habit of swimming in the morning. Once he (she) returns to night shift, he (she) swims in the morning habitually. In other words, for some people, sports habit is the more regular and common behavior. Measurement of regular sports habit is mostly based on the tool developed by Centers for Disease Control and Prevention of the U.S. in 1995 (U.S. Department of Health and Human Services 1996). It suggests that people should practice moderate sports for at least 30 minutes every day, at least five days every week, or vigorous sports for at least 20 minutes every day, three days every week. In addition, according to 2014 survey on sports cities in Taiwan, sports population increases year by year and participation rate is 82.4%. Regular sports population increases from 31.3% in 2013 to 33%. It has increased by 1.7%. In other words, with the increase of people's health consciousness and leisure time, their sports habit changes. It results in different sports behaviors. For long term, sports habit influences people's engagement in sports (Lee, 2010). Is sports behavior the behavior reasoned or sports habit? The scholars had different views (Trafimow, 2000; Verplanken & Orbell, 2003). Aarts, Paulussen, and Schaalma (1997) argued that repetitive behaviors are mostly determined by habit instead of behavior reasoned.

When habit is established, the following behaviors are resulted from habit and they are voluntary. Likewise, Wu and Ho (2014) argued that human beings' behaviors are not totally rational and some are influenced by habit which can effectively predict future

behavior. They further suggested that although TPB is based on complete theoretical framework, when individuals also develop sports habit, they must concern about the effect of habit on intention or behavior. In other words, it is worthy to find if the suspension of sports habit (such as the previous example of night shift) results in individuals' different degrees of emotional change. According to related literatures, habit shows certain degree of moderating effect between intention and behavior (Murtagh, Rowe, Elliott, McMinn & Nelson, 2012; Hashim, Jawis, Wahat & Grove, 2014). In other words, sports habit moderates positive relationship between behavioral intention and behavior. In other words, in comparison to people with inferior sports habit, those with superior sports habit show more significant positive effect of behavioral intention on behavior. According to past related literatures, effects of subjective norm, attitude and perceived behavior of The Theory of Planned Behavior on behavioral intention applied in sports were

empirically validated (Downs & Hausenblas, 2005; Norman & Conner, 2005; Downs, Graham, Yang, Bargainier & Vasil, 2006; Symons & Hausenblas, 2005; Brickell, Chatzisarantis & Pretty, 2006). In order to further validate moderating effect of sports habit between behavioral intention and behavior, this study treats members of swimming pools of public universities as subjects for the research.

Research Method

Research Structure

According to research purpose and related literatures, this study constructs research structure of public swimming pool members' sports behavior model of swimming. It aims to probe into effects of subjective norm, attitude and perceived behavior on behavioral intention and behavior and further validates moderating effect of sports habit between behavioral intention and behavior, as shown in Figure 1.

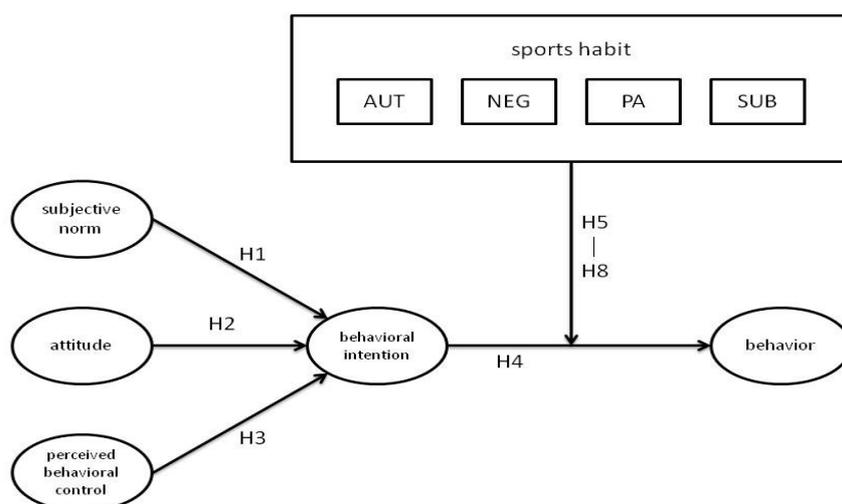


Figure 1 - Research Framework

Research Hypotheses

According to research purpose and related literatures, this study proposes the following hypotheses.

- H1 - subjective norm significantly influences behavioral intention.
- H2 - Attitude significantly influences behavioral intention.
- H3 - Perceived behavioral control significantly influences
- H4 - Behavioral intention significantly influences behavior
- H5 - AUT of sports habit shows moderating effect between behavioral intention and behavior.
- H6 - NEG of sports habit shows moderating effect between behavioral intention and behavior.
- H7 - PA of sports habit shows moderating effect between behavioral intention and behavior.
- H8 - SUB of sports habit shows moderating effect between behavioral intention and behavior.

Research Tools

This study introduces habit in original TPB framework as moderator variable to design questionnaire. Items include two parts: (a) scale of TPB and (b) scale of sports habit. It includes 22 items (table). Each item is measured by Likert 7-point Scale (1=strongly disagree, 7=strongly agree). According to suggestion of Moderate-to-Vigorous Physical Activity (MVPA) developed

by Grove, et al(2014), in this study, intensity measurement indices of sports habit are classified into Patterned action (PAT), Strong Stimulus-response Bonds (SRB), Automaticity (AUT) and Negative consequences if not done (NEG) (including 8 items).

Theoretical development of TPB has been matured and supported by numerous studies. Besides, the research findings demonstrate that it can effectively explore determinants of human beings' health related behavior (such as sports, diet and safety behavior) (Ajzen & Manstead, 2007). In the field of sports behavior, the prediction and explained power of the said theory on behavior are considerably recognized (Gucciardi & Jackson, 2015; Nigg & Durand, 2016). Thus, based on framework of TPB, this study classifies items of scale of TPB into "subjective norm", "behavioral attitude", "perceived behavioral control", "behavioral intention" and "behavior" (Ajzen, 2002) to design and revise content of scale (including 14 items).

Research Subjects

Research subjects are members of swimming pools of public universities in Taiwan. By convenience sampling, it obtained 680 members as samples and retrieved 670 ones. Return rate was 98.5%; there were 650 valid questionnaires and valid questionnaire rate was 97%.

Results and Analysis

Analysis of Basic Information

According to Table 1, among 650 valid samples, there are more them

are full-time and they are 418 subjects and percentage is 64.3%; as to education, most of them are graduated males. They are 398 subjects and percentage is 61.2%; as to age, most of

them are below (including) 20 years old. They are 217 subjects and percentage is 33.4%; as to job, most of from university (college) and there are 237 subjects and percentage is 36.5%;

Table 1 - Characteristics of Samples

Variable	Category	Frequency	Percentage %
Gender	Male	398	61.2
	Female	252	38.7
Age	Below (including) 20 years old	217	33.4
	21~25 years old	84	12.9
	26~30 years old	66	10.2
	31~35 years old	200	30.8
	36~40 years old	70	10.8
	41~45 years old	4	0.6
	46~50 years old	5	0.8
	Above (including) 51 years old	4	0.6
Occupation	Full-time	418	64.3
	Part-time	219	19.8
	Unemployed	49	7.5
	Student	51	7.8
	Retired/Housekeeping	2	0.3
	Others	1	0.2
Educational level	Below (including) junior high school	102	15.7
	Senior high school and vocational school	123	18.9
	Junior college	81	12.5
	College and university	237	36.5
	Graduate school (including) or above	107	16.5
Weekly	1~2 days	141	21.7
	3~4 days	167	25.7
	5~6 days	77	11.8
	More than 6 days	265	40.8
Residential places	Northern Taiwan	135	20.8
	Central Taiwan	153	23.5
	Southern Taiwan	204	31.4
	Eastern Taiwan	106	16.3
	Off shore islands	52	8.0

as to weekly average swimming frequency, above 6 days is the most and they are 265 subjects and percentage is 40.8%; as to residential place, most of them are in southern Taiwan and there are 204 subjects and percentage is 31.4%.

Measurement Model

Convergent validity.

According to Tables 2 and 3, standardized regression coefficients of variables in The Theory of Planned Behavior and habit model are 0.73~0.93 and they are more than 0.7. Composite reliability of latent variable are

0.84~0.92 and they are higher than 0.6. Average Variance Extracted are 0.69~0.85 and they are higher than 0.50. It shows that the model reveals good convergent validity (Wu, 2007).

Discriminant Validity.

Tables 4 and 5 show Bootstrap correlation coefficient upon 95% confidence interval of scale of The Theory of Planned Behavior and habit scale. According to the tables, correlation coefficients do not include 1. Hence, scale of The Theory of Planned Behavior and habit scale of this study reveal discriminant validity (Wu, 2009).

Table 2 - Measurement Model Analysis of Scale of The Theory of Planned Behavior

Items	Standardized loading	Non-standardized loading	S.E.	C.R. (t-value)	p	SMC	C.R.	AVE
A1<--- Subjective norm	0.81	1.00				0.66	0.85	0.74
A3<--- Subjective norm	0.91	1.09	0.05	23.03	***	0.83		
B2<--- Attitude	0.93	1.00				0.86	0.92	0.85
B3<--- Attitude	0.91	1.02	0.03	32.16	***	0.83		
C3<---Perceived behavioral control	0.86	1.00				0.74	0.88	0.65
C4<---Perceived behavioral control	0.80	1.01	0.04	24.34	***	0.64		
C5<---Perceived behavioral control	0.84	1.02	0.04	26.37	***	0.70		
C6<---Perceived behavioral control	0.72	0.90	0.04	20.70	***	0.51		
D1<---Behavioral intention	0.90	1.00				0.80	0.92	0.80
D2<---Behavioral intention	0.91	0.99	0.03	33.96	***	0.82		
D3<---Behavioral intention	0.87	0.96	0.03	30.96	***	0.75		

Table 3 - Measurement Model Analysis of Habit Scale

Items	Standardized loading	Non-standardized loading	S.E.	C.R. value)	(t- p	SMC	C.R.	AVE
F1<---AUT	0.88	1.00				0.77	0.91	0.83
F2<---AUT	0.94	1.09	0.04	30.20	***	0.88		
F3<---NEG	0.93	1.00				0.86	0.82	0.69
F4<---NEG	0.72	0.75	0.04	19.86	***	0.52		
F5<---PA	0.84	1.00				0.70	0.88	0.79
F6<---PA	0.93	1.06	0.04	28.27	***	0.86		
F7<---SUB	0.93	1.00				0.87	0.91	0.83
F8<---SUB	0.89	0.98	0.03	31.17	***	0.79		

Table 4 - Bootstrap Correlation Coefficients upon 95% Confidence Interval of Scale of The Theory of Planned Behavior

Parameter		Estimated	Bias-corrected		Percentile method	
			Lower	Upper	Lower	Upper
Subjective norm	<--> Attitude	0.77	0.71	0.82	0.71	0.82
Subjective norm	<--> Perceived behavioral control	0.63	0.55	0.70	0.56	0.70
Subjective norm	<--> Behavioral intention	0.53	0.46	0.59	0.46	0.59
Attitude	<--> Perceived behavioral control	0.62	0.55	0.68	0.55	0.68
Attitude	<--> Behavioral intention	0.56	0.49	0.62	0.49	0.62
Perceived behavioral control	<--> Behavioral intention	0.82	0.78	0.86	0.78	0.86
Attitude	<--> Behavior	0.56	0.47	0.62	0.48	0.63
Perceived behavioral control	<--> Behavior	0.72	0.66	0.77	0.66	0.77
Behavioral intention	<--> Behavior	0.62	0.54	0.68	0.54	0.68
Subjective norm	<--> Behavior	0.63	0.55	0.71	0.55	0.71

Table 5 - Bootstrap Correlation Coefficients Upon 95% Confidence Interval of Habit Scale

Parameter		Estimated	Bias-corrected		Percentile method	
			Lower	Upper	Lower	Upper
AUT	<--> NEG	0.76	0.71	0.81	0.71	0.81
AUT	<--> PA	0.76	0.70	0.81	0.70	0.82
AUT	<--> SUB	0.69	0.62	0.75	0.62	0.75
NEG	<--> PA	0.81	0.74	0.87	0.75	0.87
NEG	<--> SUB	0.72	0.64	0.78	0.64	0.78
PA	<--> SUB	0.81	0.75	0.86	0.75	0.86

Overall model analysis

By SEM, this study validates measurement effects of latent variables and manifest variables and causal relationship among latent variables. Based on statements of Bagozzi and Yi (1988), Benter (1992), Wu(2009) and Hair et al.(1998), it adopts χ^2 test, ratio between χ^2 and degree of freedom, GFI, AGFI, RMSEA, CFI and PCFI as

measures of overall model fit evaluation. According to Table 6, after adjustment, ratio between χ^2 and degree of freedom is 4.77; GFI is 0.94; AGFI is 0.90; RMSEA is 0.76; CFI is 0.97; PCFI is 0.72; according to research findings, there is high degree of fit between model samples and conceptual model. Hence, the research model is acceptable.

Table 6 - Overall Model Fit Analysis

Fit Indices	Acceptable standard	Adjusted model	Judgment of model fit
χ^2 (Chi-square)	The smaller the better	276.89	
χ^2 and ratio of degree of freedom	<3	4.77	Unfitted
GFI	>0.90	0.94	Fitted
AGFI	>0.80	0.90	Fitted
RMSEA	<0.08	0.76	Fitted
CFI	>0.80	0.97	Fitted
PCFI	>0.50	0.72	Fitted

Validation of moderating effect

Baron & Kenny(1986) defined moderating effect below: 1) first, by simple regression analysis, it shows significant effect of independent variable on dependent variable. 2) Interactive variable (independent variable \times moderator) shows significant effect on dependent variable. Adjusted R² is higher than R² of independent variable on dependent variable. The moderator shows significant moderating effect. Hence, by hierarchical regression analysis, this study validates moderating effect in order to find if AUT of habit shows moderating effect between behavioral intention and behavior.

Mutual effect coefficients of AUT of habit and relationship between behavioral intention and behavior are

shown in Tables 7 and 8. Analytical result is shown below:

Mode 1: by hierarchical regression, it analyzes effect of behavioral intention(independent variable) on behavior (dependent variable), coefficient $\beta = 0.540$ and $p = 0.000$, $p < .001$. It shows significant effect. Hence, condition of moderating effect is supported.

Mode 2: by hierarchical regression, it analyzes effect of AUT of habit on behavior, coefficient $\beta = 0.665$ (see Table 7) and it shows significant effect.

Mode 3: by hierarchical regression, it analyzes AUT of habit and behavioral intention and their interaction and

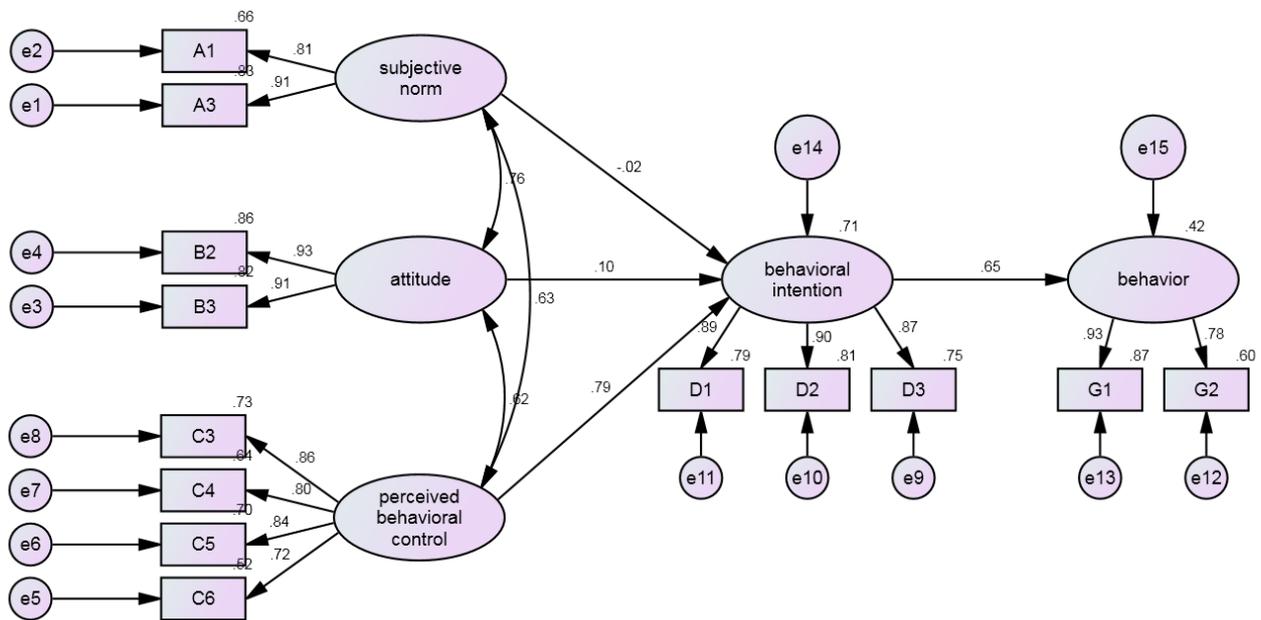


Figure 2 - Sports Behavior Model of Swimming of Members of Swimming Pools

Table 7 - Regression Analytical Result of AUT of Habit and Behavior

Dimension/ variable	B	R2	Adj.R2	t value	F value	P value
AUT of habit on behavior	0.665***	0.442	0.441	22.659	513.442	0.000

***p<.001

Table 8 - Hierarchical Regression Analytical Result of AUT of Habit and Effect of Behavioral Intention on Behavior

Dependent variable \ Independent variable	Mode 1	Mode 2	Mode 3
Behavioral intention	0.540***		0.103*
AUT of habit		0.596***	0.587***
behavioral Intention × AUT of habit			0.111***

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

behavior. Results shows significant effect (see Table 8). Hence, H5 is supported. Mutual effect coefficients of NEG of habit and effect of behavioral

intention on behavior are shown in Tables 9 and 10. Analytical result is revealed as follows:

Mode 1: by hierarchical regression, it analyzes effect of behavioral intention(independent variable) on behavior (dependent variable), coefficient $\beta = 0.540$ and $p = 0.000, p < .001$. It shows significant effect. Hence, condition of moderating effect is supported.
 Mode 2: by hierarchical regression, it analyzes NEG of habit and behavior,

coefficient $\beta = 0.756$ (see Table 9) and it shows significant effect.

Mode 3: by hierarchical regression, it analyzes NEG of habit and behavioral intention and the interaction and behavior. The result reveals significant effect (see Table 10). Hence, H6 is supported.

Table 9 - Regression Analytical Result of NEG of Habit and Behavior

Dimension/ variable	B	R2	Adj.R2	t value	F value	P value
NEG of Habit on Behavior	0.756***	0.572	0.571	29.399	864.305	0.000

*** $p < .001$

Table 10 - Hierarchical Regression Analytical Result of NEG of Habit and Effect of Behavioral Intention on Behavior

Independent variable \ Dependent Variable	Mode		
	Mode 1	Mode 2	Mode 3
Behavioral Intention	0.540***		0.171***
Habits behavioral		0.655***	0.658***
Intention \times habits			0.174***

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

Mutual effect coefficients of PA of habit and effect of behavioral intention on behavior are shown in Tables 11 and 12. Analytical result is revealed as follows:

Mode 1: by hierarchical regression, it analyzes effect of behavioral intention(independent variable) on behavior

(dependent variable), coefficient $\beta = 0.540$ and $p = 0.000, p < .001$. It shows significant effect. Hence, condition of moderating effect is supported.
 Mode 2: by hierarchical regression, it analyzes PA of habit and behavior, coefficient $\beta = 0.579$ (see Table 11). It shows significant effect.

Table 11 - Regression Analytical Result of PA of Habit and Behavior

Dimension/variable	B	R2	Adj.R2	t value	F value	P value
PA of habit on behavior	0.579***	0.335	0.334	18.056	326.003	0.000

*** $p < .001$

Mode 3: by hierarchical regression, it analyzes PA of habit and behavioral intention and the interaction and be-

havior. Result shows significant effect (see Table 12). Hence, H7 is supported.

Table 12 - Hierarchical Regression Analytical Result of PA of Habit and Effect of Behavioral Intention on Behavior

Dependent variable \ independent variable	Mode 1	Mode 2	Mode 3
Behavioral intention	0.540***		0.203***
PA of habit		0.406***	0.432***
Behavioral intention × PA of habit			0.125***

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

Mutual effect coefficients of SUB of habit and effect of behavioral intention on behavior are shown in Tables 13 and 14. Analytical result is revealed as follows.

Mode 1: by hierarchical regression, it analyzes effect of behavioral intention (independent variable) on behavior (dependent variable), coefficient $\beta = 0.540$ and $p = 0.000$, $p < .001$. It shows significant effect. Hence, condition of moderating effect is supported.

Mode 2: by hierarchical regression, it analyzes SUB of habit and behavior, coefficient $\beta = 0.676$ (see Table 6) and it shows significant effect.

Mode 3: by hierarchical regression, it analyzes SUB of habit and behavioral intention and the interaction and behavior. The result shows significant effect (see Table 14). Thus, H8 is supported.

Validation of Hypotheses

H1 is not supported. In other words, subjective norm does not significantly influence behavioral intention. The result is inconsistent with research findings of Downs, Graham, Yang, Bargainnier, and Vasil (2006). The reason can be in that when swimming becomes part of daily live, swimming pool members are not easily influenced by important others or relatives and friends. H2 is supported. Attitude significantly influences behavioral intention. The result is consistent with research finding of Downs and Hausenblas (2005). The reason can be in that when swimming pool members identify with sports benefits of swimming, their attitude toward swimming is more positive. It enhances their intention to engage in swimming. H3 is supported. Hence, perceived behavioral control significantly influences behavioral intention. The result is similar to research finding of Norman and Conner (2005).

The reason can be in that when swimming pool members can control their skills or swimming related

Table 13 - Regression Analytical Result of SUB of Habit and Behavior

Dimension/variable	B	R2	Adj.R2	t value	F value	P value
SUB of habit on behavior	0.676***	0.457	0.456	23.366	545.969	0.000

***p<.001

Table 14 - Hierarchical Regression Analytical Result of SUB of Habit and Effect of Behavioral Intention on Behavior

dependent variable				
independent variable	Mode 1	Mode 2	Mode 3	
Behavioral intention	0.540***		0.218***	
SUB of habit		0.552***	0.533***	
behavioral intention× SUB of habit			0.066***	

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

knowledge, they are more likely to engage in swimming. H4 is supported. In other words, behavioral intention significantly influences behavior. The result is similar to research findings of Nigg and Durand (2016). The reason can be in that when swimming pool members can highly control the dimensions of swimming, they are more likely to engage in swimming. H5 is supported. In other words, AUT of habit shows moderating effect between behavioral intention and behavior. The result is different from research finding of Kaushal and Rhodes (2014). The reason can be in that when swimming participants treat swimming as spontaneous behavior, those with swimming habit show more positive effect of behavioral intention on behavior than the ones who do not have swimming habit. H6 is supported. Thus, NEG of habit shows moderating effect between behavioral intention and behavior. The result is different from research finding of Verplanken and Melke

vik (2008). The reason can be in that when swimming participants are used to swimming, with the sudden suspension, those with swimming habit show more positive effect of behavioral intention on behavior than the ones without swimming habit. H7 is supported. Thus, PA of habit shows moderating effect between behavioral intention and behavior. The result is different from research finding of Rhodes, de Bruijn, and Matheson (2010). The reason can be in that when swimming pool members' swimming time is fixed, those with swimming habit show more positive effect of behavioral intention on behavior than the ones without swimming habit. H8 is supported. In other words, SRB of habit shows moderating effect between behavioral intention and behavior. The result is different from research finding of Gardner, de Bruijn, and Lally (2011). The reason can be in that when swimming pool members are familiar with software and hardware of swimming envi-

ronment, those with swimming habit show more positive effect of behavioral intention on behavior than the ones without swimming habit.

Conclusion and Suggestions

Conclusion

Taiwan is an island and since it is surrounded by ocean, water activities become popular. Swimming competence thus is critical in modern educational policy or promotion of national sports in Taiwan. Promotion of swimming reduces the gap between the people and water areas. Swimming pools of public universities hence play the role as promoters in townships or communities. The places and services provided allow social public to cultivate positive swimming habit which is transformed into one of basic skills of national life. Therefore, based on The Theory of Planned Behavior, this study treats swimming pools of public universities as research scope. By empirical research, it explores sports habit as moderator variable in the relationship between behavioral intention and behavior. By questionnaire survey, this study analyzes variables and obtains the following conclusions.

- (1) Swimming pool members' subjective norm does not significantly influence behavioral intention.
- (2) Swimming pool members' attitude significantly influences behavioral intention.
- (3) Swimming pool members' perceived behavioral control significantly influences behavioral intention.
- (4) Swimming pool members' behavioral intention significantly influences behavior.

- (5) Swimming pool members' AUT of habit shows moderating effect between behavioral intention and behavior.
- (6) Swimming pool members' NEG of habit shows moderating effect between behavioral intention and behavior.
- (7) Swimming pool members' PA of habit shows moderating effect between behavioral intention and behavior.
- (8) Swimming pool members' SUB of habit shows moderating effect between behavioral intention and behavior.

Suggestions

By empirical data analysis and according to conclusions, this study proposes several suggestions as reference.

- (1) For swimming pool members

According to research findings, path value of perceived behavioral control on behavioral intention is the highest. Thus, it is suggested that swimming pool members can reinforce their control of swimming. For instance, they can participate in swimming related communities to expand their opportunities and resources of swimming participation. In these swimming communities, they can approach the companies and exchange swimming experience with them. Besides, some swimming groups even hold morning sea swimming or competitions of triathlon. With diverse swimming activities and competitions, swimming pool members can acquire the experience. In addition, when they return to swimming pools, they can more easily control indoor swimming since they have participated in outdoor environment of sea swimming. Furthermore, it is suggested that swimming pool members can participate in related forums to enhance

knowledge and competence of swimming, such as issues related to sports injuries. Since swimming relies on paddling by arms, swimming pool members tend to unconsciously encounter repetitive injuries due to pursuit for performance or overloading exercise to maintain certain swimming distance. Besides, long-term swimming might cause discomfort of knees, backs, ankle joints or elbow joints. Therefore, related forums of prevention from swimming injuries allow swimming pool members to more recognize themselves. By experts' knowledge sharing, swimming pool members can not only extend the age to swim, but also control their physical state to reinforce behavioral intention of swimming.

(2) For managers of swimming pools of public universities

According to research findings, sports habit shows moderating effect between behavioral intention and behavior. It is suggested that managers of swimming pools of public universities not only provide excellent service quality, but also strengthen members' sports habit by other measures to enhance connection between members and swimming pools. For instance, maintenance of swimming pools of public universities is essential in daily time. There must be announcements in advance for the members to inform them of regular water changing time and maintenance period of water, electricity, generator room and public facilities. Besides, they can announce the schedules of large-scale competitions, borrowing and training classes to avoid swimming members' anxiety due to temporary suspension of their swimming habit. In addition, it is suggested that swimming pools of public universities should avoid large-scale change of

interior traffic flow in the swimming pools. Swimming pool members search for stable environmental clues to establish their own sports habit and they are used to familiar place and traffic flow. Once the traffic flow of swimming pools is changed significantly and it is no longer members' use habit, it might lower the stimulus of behavioral inertia. Finally, opening hours of swimming pools of public universities during winter and summer vacations can change since the students are absent. It is suggested that managers of swimming pools of public universities can include opening hours in summer and winter vacations in the announcement of management articles of the universities. Thus, swimming pool members can cultivate regular sports habit and establish their fixed behavioral reaction.

(3) For future research

This study focuses on members of swimming pools of public universities and it treats sports habit as moderator variable to explore sports behavior of swimming. As to practical contribution, since government of Taiwan and educational sectors pay more attention to implementation of swimming policy, this study focuses on swimming participants and probes into sports habit of swimming. It practically enhances the vision of "national swimming and let's go swimming". In addition, for the managers of swimming pools of public universities, through this study, they can recognize the factors to establish swimming pool members' sports habit to lead to mutual dependency between management of swimming pools and members. It is also one of the practical contributions of this study. As to research contribution, according to past literatures related to The Theory of Planned

Behavior, most of studies rarely included sports habit in the model. This study not only enhances the application scope of The Theory of Planned Behavior, but also treats sports habit as moderator variable to obtain the result of statement which will serve as reference for research on The Theory of Planned Behavior in sports field. As to suggestions for future research, for general people, they construct sports habit by regular

time or sports environment. Nevertheless, for the disabled, they encounter more constraints to develop swimming habit, in comparison to general people. Therefore, future researchers can further probe into the role of sports habit as moderator variable in the relationship between behavioral intention and behavior. The findings will practically enhance the disabled or management units of swimming pools of public universities.

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