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BEHAVIORAL INTENTIONS OF JUNIOR HIGH SCHOOL TABLE TENNIS TEAM PARTICIPANTS: THEORY OF PLANNED BEHAVIOR

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Abstract

This study explored the behavioral intentions of junior high school table tennis team participants based on the theory of planned behavior. We distributed 430 questionnaires through intentional sampling, and 400 responses were returned, with a recovery rate of 93%. We excluded 30 invalid questionnaires, with an effective recovery rate of 93.5%. SPSS and AMOS were used for statistical analysis. The findings indicate that: (1) attitude, (2) subjective norms, and (3) perceived behavioral control significantly affected behavioral intentions. Practical suggestions are provided based on the results.

Key words: Table tennis school team, attitude, subjective norm, behavioral intention, perceived behavioral control

Introduction

Table tennis (ping pong) has typically been an important competitive sport in Taiwan and has achieved successful results in international competitions. It is a key sport for Taiwan in winning medals in the Olympic Games. Taiwan's initial development of table tennis can be traced back to 1915 when J. H. Grocker of the Shanghai Chinese Youth Association and Shi-Ying Chao and Hsing-men Tong of Taiwan began promoting table tennis in Taiwan. The Shanghai Table Tennis Association was established the following year, marking the beginning of table tennis in Taiwan (Wu, 1993a; 1993b). The Taiwan Athletics Association was formally established in 1940. Furthermore, the Taiwan Table Tennis Committee was responsible for promoting table tennis in the provinces and included table tennis in official provincial competitions (Chou et al., 2023). The equipment for table tennis is relatively simple compared to other sports. It requires a small area that is easy to arrange within indoor venues to avoid weather factors that affect outdoor activities. In the early days of liberation, when resources were relatively scarce,

table tennis became popularized as a successful leisure sport.

Research suggests that it takes 8 to 10 years to train an excellent athlete to reach the Olympic level, which can be described as another competition behind competitive sports. World Table Tennis (WTT) was established based on the current tournament system, which was optimized and upgraded by the International Table Tennis Federation in 2019. The WTT Youth Series is a starting-level event. It is considered a basic event for constructing U19, encompassing events categorized by age, such as U11, U13, U15, U17, and U19. The Chinese Taipei Table Tennis Association has planned to strengthen the competitiveness of Taiwan Table Tennis in world competitions. As such, it has planned all levels (age groups) of table tennis tournaments in accordance with the classification of the WTT Youth Series while concerning the characteristics suitable for Taiwan table tennis talent selection and reserve talent training, as well as Taiwan's school system. It has established a complete selection and training system for athletes from elementary, middle, and high school to university, and even for adult athletes (Chou, 2008; Chou et al., 2023; Chou and Hsu, 2022; Su, 2013).

The theory of planned behavior is derived from the theory of rational behavior (Ajzen and Fishbein, 1975). The theory of rational behavior development was influenced by the control of an individual's self-will, where the specific aspects that an individual engages in depend on behavioral intention. The theory of rational behavior suggests that an individual's behavioral intention is the decisive factor for their behavior, and the intention is primarily formed based on attitude and subjective norms. The theory of RATIONAL behavior can effectively predict behavior under the precondition that individual can control their participatory behavior. However, several other factors affect the controllability of individual will. For instance, school team players may be required to stay for extra lessons during practice time due to learning challenges. Parents and coaches may have differing opinions regarding training arrangements, affecting players' behavior in training. However, the theory of rational behavior fails to provide reasonable explanations for factors beyond the control of individual will, such as time, resources, information, and technology (Ajzen, 1985). This is because individual volitional control of behavior is often affected by internal and external factors (Chung, 2012; Huang, 2013; Kao, 2017; Li, 2017; Ou, 2015; Shih, 2015). Ajzen (1985) proposed the theory of planned behavior to explain factors beyond the controllability of individual will that are not explained by the theory of rational behavior.

Based on the theory of rational behavior, perceived behavioral control (PBC) is added. PBC comprises a dimension (Ajzen, 1987) to supplement the influencing factors beyond the controllability of individual will to enable a more reasonable interpretation and prediction of behaviors (Ajzen, 1985; 1991). The theory of planned behavior can effectively explain and predict behavioral intentions with the addition of PBC. Attitude refers to an individual's evaluation and emotional response to a specific

behavior. Subjective norms refer to the degree of support for an individual's behavior from someone who has an essential relationship with them. It also refers to the social pressure on individuals to engage in a particular behavior. In contrast, perceived behavioral control refers to the subjective assessment of an individual's resource needs and abilities for the specific behavior they wish to accomplish. This theory assumes that attitude, subjective norms, and perception of behavioral control affect each other. In contrast, behavioral intention is impacted by attitude, subjective norms, and perception of behavioral control to varying degrees (Ajzen, 1985). Figure 1 presents the model structure of the theory of planned behavior.

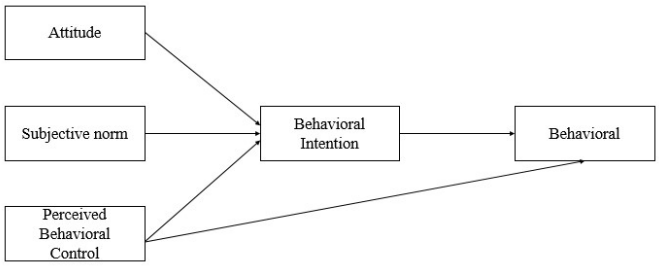

Figure 1. Model Structure of the Theory of Planned Behavior

Sheeran et al. (2002) compared 30 different behaviors using the theory of planned behavior and the theory of rational behavior. They found that the average increment of variation explanation amount of the theory of planned behavior was 8% compared to that of the theory of rational behavior. Eves, Hoppe, and McLaren (2003) compared the theory of planned behavior with the theory of rational behavior to explain individual behavioral intention, taking individual health behavior as the variable criterion. Their findings showed that the theory of rational behavior had 40% predictive power and the theory of planned behavior had 53% predictive power in explaining behavioral intention. Downs and Hausenblas (2005) conducted a meta-analysis of 111 sports participation behaviors and compared them using the theory of planned behavior and the theory of rational behavior. Their findings indicate that the theory of planned behavior had better explanatory power for individual sports participation behavior. Ajzen and Manstead (2007) examined several studies and found that the theory of planned behavior can effectively explain the decisive factors of human health-related behaviors (e.g., leisure exercise and weight loss). The above research indicates that the theory of planned behavior has better explanatory power to predict individual behavior. Chang and Hsu (2008) applied the theory of planned behavior to examine influencing factors of students' intention to participate in summer sports and recreational camps. They found that subjective

norms had the greatest influence on behavioral intention, followed by attitude; perceived behavioral control did not significantly impact behavioral intention. Chang and Cheng (2009) developed a model fit for senior high school students' participation intention in sports associations based on the theory of planned behavior while investigating the impact of each potential variable on students' participation intention in sports associations. The results indicate that perceived behavioral control had the greatest impact on high school students' intention to participate in sports associations, followed by attitude; subjective norms did not significantly affect their intention to participate in sports associations. Li, Huang, and Hsu (2011) constructed the behavioral tendency model regarding college students participating in squash sports based on the theory of planned behavior. The results indicate that attitude, subjective norms, and perceived behavioral control had significant direct effects on behavioral intention. Cheng, Chuang, and Nien (2012) examined the prediction of attitudes, subjective norms, and perceived behavioral control on college students' behavioral intention at differing exercise stages. Their findings indicate that intention was primarily affected by perceived behavioral control, followed by attitude and subjective norms.

The international table tennis development trend suggests that participants in age-based competitions are getting younger. More and more top table tennis players from various countries choose to challenge adult players, making the cultivation of junior high school players particularly important. Furthermore, Chang et al. (2017) found that in the current 12-year Basic Education Curriculum, the Ministry of Education lists the competition event as one of the competitive items. The goal is to encourage students to join sports teams and develop their sports potential to improve competitive strength against the backdrop of traditional educational doctrine (Ministry of Education, 2012). Therefore, it is a positive aspect that sports must be valued to mitigate excellent athletes being overlooked in the face of a challenging academic environment. Based on the above, this study adopted the theory of planned behavior (Ajzen, 1985; 1989) as the theoretical basis for model construction. The goal was to explore the behavioral intention of junior high school table tennis team participants by taking the theory of planned behavior as the main axis. The findings can provide an essential reference for parents, schools, teachers, and educational units.

Methods

Research Structure

This study explored the behavioral intention of participants on a junior high school table tennis team based on the theory of planned behavior. The proposed research framework is based on the literature review, as shown in Figure 2.

Research Hypotheses

This study's research hypotheses are proposed according to the research purpose, questions, and framework, as follows:

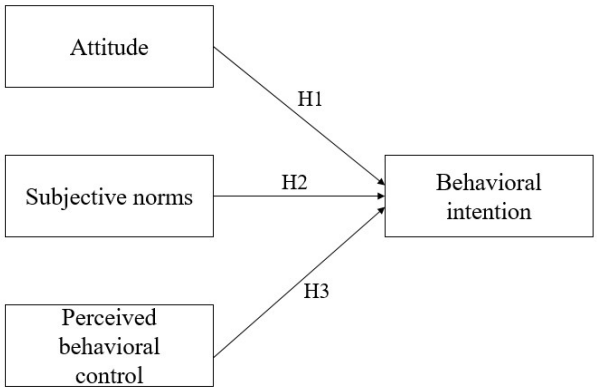

Figure 2. Research Framework

H1: Attitude significantly affects behavioral intention.

H2: Subjective norms significantly affect behavioral intention.

H3: Perceived behavioral control significantly affects behavioral intention.

Research Subjects

This study selected a junior high school table tennis team as the research subject, and participants were recruited through intentional sampling. From August 1 to August 31, 2024, 430 questionnaires were distributed to junior high school table tennis teams in the northern, central, southern, and eastern areas and outlying islands and through the Google Forms questionnaire website via social media. A total of 400 questionnaires were collected, with a recovery rate of 93%. After invalid questionnaires were deleted, a total of 374 valid questionnaires were obtained, with a validity rate of 93.5%.

Research Tools

The study questionnaire aligns with the relevant literature of Yen (2013) and was distributed to junior high school table tennis teams. The questionnaire comprised four questions regarding basic personal information, five questions regarding attitude, four questions about subjective norms, four questions about behavioral intention, and four questions for perceived behavioral control. The total number of questions was 21. Responses were measured on a seven-point Likert scale, and each item was given a score of 1 to 7 points from "strongly disagree" to "strongly agree," respectively.

Data Analysis Method

This study used SPSS 22.0 statistical software to document the results of the valid questionnaires. AMOS 22.0 statistical software was used to analyze the correlations between variables.

Results

Sample Characteristics

This study recruited the members of junior high school table tennis teams as the research subjects. Among the 374 valid samples, 228 respondents were male, accounting for 61.0% of the valid samples. There were 146 female respondents, accounting for 39.0% of the valid sample. Regarding grade level, 141 respondents were in Grade Two, accounting for 37.7% of the valid sample. There were 113 respondents in Grade Three, accounting for 30.2% of the valid sample. Regarding years of training, 125 respondents (67.1% of the valid sample) had received more than five years of training, while 28 had received less than three years of training, accounting for 7.5% of the valid sample. In terms of residential areas, 302 respondents were from the north, accounting for 80.7% of the valid sample, and eight respondents were from the east and outlying islands, accounting for 2.1% of the valid sample (Table 1).

Table 1. Respondent Characteristics

Variable	Category	Number of people	Percentage %	Cumulative percentage %
Gender	Male	228	61.0	61.0
	Female	146	39.0	100.0
Grade	Grade one	120	32.1	32.1
	Grade two	141	37.7	69.8
	Grade three	113	30.2	100.0
Training years	Less than three years	28	7.5	7.5
	Three to five years (exclusive)	95	25.4	32.9
	More than five years (inclusive)	125	67.1	100.0
Residential area	North	302	80.7	80.7
	Midland	26	7.0	87.7
	South	38	10.2	97.9
	Eastern and outlying islands	8	2.1	100.0

Measurement Pattern Analysis

It may be necessary to strengthen the overall fitness index when conducting confirmatory factor analysis. We referred to the modification index (MI) (Bagozzi and Yi, 1988). In this study, attitude 3, attitude 4, subjective norm 4,

perceived behavioral control 1, perceived behavioral control 2, and behavior intention 3 of the scale were removed.

1. Convergent validity: Convergent validity was measured by the combined reliability (CR) and Average Variance Extracted (AVE) of the questionnaire dimensions. Research suggests that the CR value should be greater than 0.6, and the AVE value should be greater than 0.5 (Fornell & Larcker 1981). We tested attitude, subjective norms, behavioral intentions, perceived behavioral control, and other dimensions. The factor loading was between 0.68 and 0.87. The CR value was between 0.69 and 0.87, and AVE was between 0.53 and 0.70. The results indicate that this study had good convergent validity. The convergent validity criteria suggested by Bagozzi and Yi (1988), Fornell and Larcker (1981), and Hair, Anderson, Tatham, and Black (1998) were met, as shown in Table 2.

2. Structural pattern analysis: This study used seven indexes including the Chi-square value (χ^2), ratio of χ^2 to the degree of freedom, GFI, AGFI, RMSEA, CFI, and PCFI to test the overall fit (Hair et al., 1998). It is recommended that the Chi-square value (χ^2) be as small as possible. The Chi-square value (χ^2) was 91.04 after correction. The χ^2 ratio to the degree of freedom is suggested to be less than 3.0, and the corrected ratio was 2.40. The GFI and AGFI values are recommended to be greater than 0.80. The revised values were 0.96 and 0.93, respectively. It is recommended that the RMSEA be less than 0.08, which was revised to 0.06. The CFI value is recommended to be greater than 0.90, revised to 0.98. The PCFI value is recommended to be greater than 0.5 and 0.68 after correction (Bagozzi & Yi, 1988). The results indicate that the overall fit index met the standard, as shown in Table 3.

The empirical results of this study are presented in Table 4 and Figure 3. Regarding H1, the path value of attitude on behavioral intention was 0.21 ($p < 0.05$), and H1 was established. In other words, the attitude of participants on school table tennis teams significantly affected behavioral intention. This finding aligns with Chang and Hsu (2008) and Chang and Cheng (2009) possibly because table tennis is a sport mainly promoted and developed in Taiwan. As an indoor sport, it is easy to start, and participants had a positive attitude, improving their intention to participate.

Regarding H2, the path value of subjective norms on behavioral intention was 0.34 ($p < 0.05$), and H2 is established. In other words, the subjective norms of participants of the school table tennis team significantly affected behavioral intention. This finding aligns with Li, Huang, and Hsu (2011) and Chang and Hsu (2008), possibly because Taiwan's table tennis has typically exhibited excellent performance in international competitions, winning people's support and attention. The table tennis team participants display basic table tennis skills and can participate in and watch table tennis matches; their teammates participate in table tennis, enhancing their support and recognition of this sport. It also improved the behavior intention of participants on these teams.

Table 2. Theory of Planned Behavior: Confirmatory Factor Analysis

Dimension	Index	Standardized loading capacity	Non-standardized loading capacity	SE	CR (t-value)	P	SMC	CR	AVE
Attitude	Attitude 1	0.86	1.00				0.74	0.85	0.66
	Attitude 2	0.83	1.09	0.06	18.92	***	0.69		
	Attitude 5	0.76	0.90	0.05	16.46	***	0.58		
Subjective norms	Subjective norm 1	0.87	1.00				0.76	0.87	0.70
	Subjective norm 2	0.85	0.92	0.04	20.64	***	0.72		
	Subjective norm 3	0.79	0.90	0.05	18.09	***	0.62		
Behavioral intention	Behavior intention 1	0.86	1.00				0.74	0.82	0.60
	Behavior intention 2	0.79	0.84	0.05	17.27	***	0.62		
	Behavior intention 4	0.68	0.81	0.06	13.95	***	0.47		
Perceived behavioral control	Perceived behavioral control 3	0.72	1.00				0.52	0.69	0.53
	Perceived behavioral control 4	0.74	1.16	0.12	9.95	***	0.55		

*p <0.05

Regarding H3, the path value of perceived behavioral control on behavioral intention was 0.43 ($p<0.05$), and H3 was established. In other words, the perceived behavioral control of participants on school table tennis teams significantly affected behavioral intention.

This research result aligns with Yang et al. (2012) and Chang and Cheng (2009). The finding suggests that table tennis teams exhibit sufficient training time to develop good physical ability to play table tennis. Through professional teacher guidance and comprehensive practice, table tennis skills are improved. This results in a higher sense of achievement, affecting participants' willingness to participate in table tennis.

Table 4. Empirical Results of the Research Hypothesis

Hypothesis	Path relation	Path value	Hypothesis is true
1	Attitude -> Behavior intention	0.21*	True
2	Subjective norm -> Behavioral intention	0.34*	True
3	Perceived behavioral control -> Behavioral intention	0.43*	True

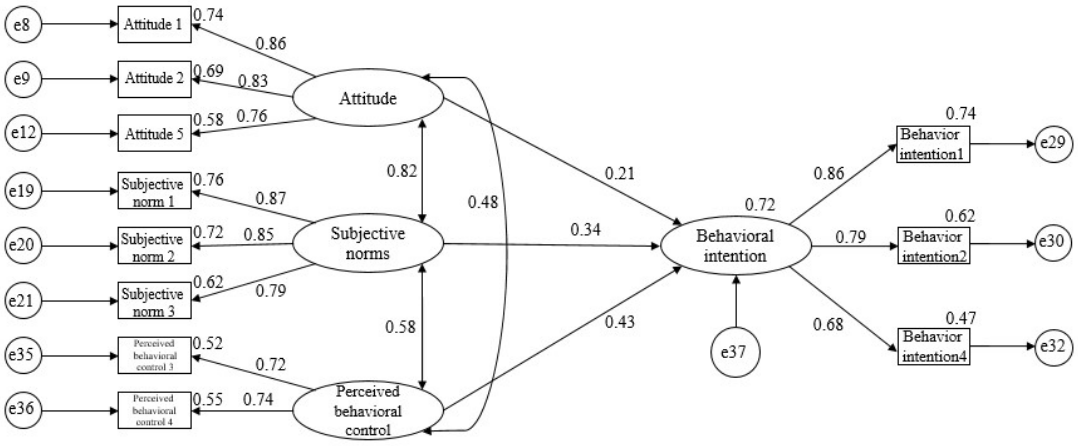

Figure 3. Study Model of Behavioral Intention of Junior High School Table Tennis Team Participants Based on the Theory of Planned Behavior

Conclusion and Suggestions

Conclusion

1. The attitude of participants on junior high school table tennis teams significantly affected their behavioral intention. According to the analysis results, H1 is established. Thus, participant attitude on table tennis teams can significantly affect behavioral intention.

2. The subjective norms of participants on junior high school table tennis teams significantly affected behavioral intention. According to the analysis results, H2 is established. The subjective norms of participants on junior high school ta-

ble tennis teams can significantly affect behavioral intention.

3. The perceived behavioral control of the participants in the junior high school table tennis team significantly affected behavioral intention. According to the analysis results, H3 is established. The perceived behavioral control of participants on junior high school table tennis teams can significantly affect behavioral intention.

Suggestions

1. Practical advice:

The results of this study indicate that the subjective norms of the participants of junior high school table tennis teams significantly affected behavioral intention. Based on the findings, we suggest that schools should establish table tennis clubs to recruit members and provide good equipment and professional teachers for club activities. This can encourage more students to play the sport and participate in these clubs, making it a characteristic school sport. Furthermore, we suggest setting up a community website for table tennis clubs to share information on exercises and competitions through social network websites. This can give full play to the influence of the network community while promoting the recognition and participation willingness of their peers. Schools can also invite Olympic table tennis players to share their experiences and inspire young people to follow in their footsteps, helping students develop a positive understanding of table tennis while promoting their willingness to participate. Moreover, based on the influence of significant contacts on participants' subjective norms, parents and tutors can encourage participants to improve their self-worth by participating in the sport with a positive, encouraging attitude. However, participating on the team means sacrificing part of school study time. There is a certain degree of pressure for a junior high school student to balance study and practice. Therefore, as teachers and parents of important people, we can give timely spiritual and material encouragement. These initiatives can help participants of junior high school table tennis teams become more confident in facing strenuous training while concentrating on the table tennis game.

The results of this study indicate that the perceived behavioral control of participants from junior high school table tennis teams significantly affected behavioral intention. Factors of perceived behavioral control include physical strength, time, money, and environment. Therefore, we suggest that table tennis team training should be planned after class as far as possible to avoid affecting students' regular learning activities. Intensive and localized training competitions can also be held during winter and summer holidays so that students can participate in exercises and competitions under less time pressure. Regarding the playing space, a table tennis room can be open for table tennis players. Through effective use management, players can use the table tennis room at a convenient time to improve practice and ability efficiently. Finally, schools can raise funds for team development to improve the training equipment and funds for participating in

competitions. This can increase the willingness of students to participate on table tennis teams. Furthermore, we suggest that schools hire suitable coaches. Teenage players require coaching to apply their technical guidance, training methods and emotional control, and other aspects of guidance. Experienced coaches can not only discover the bottlenecks faced by players but also serve as spiritual mentors. Schools should let participants know that they have a trusted coach to help them improve their level. This can give participants more confidence in the environment and technology and encourage them to continue participating in this sport.

2. Suggestions for future research:

This study recruited participants of junior high school table tennis teams as the research subjects. We suggest that subsequent studies explore the experiences of participants of table tennis teams of varying ages while comparing their behavioral intentions to expand the scope of research, making it more inferential.

This study comprised a survey questionnaire, so it is challenging to understand the inner thoughts of the subjects. Therefore, we suggest that subsequent research verify the findings through qualitative methods such as nonstructured interviews; thus, research can elicit qualitative and quantitative results to make the conclusions more comprehensive.

We suggest that future research extend and integrate other theories based on the theory of planned behavior for further exploration. For instance, scientific training combined with scientific training software has become a powerful tool for training players. We suggest that the theory of planned behavior can be combined with a technology acceptance model to understand the acceptance and training effectiveness of team participants through smart rackets and smart scheduling interactive team training systems. Such findings could help to understand the effectiveness of the participants through sports technology intervention.

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